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JAN 24 2020

Mr. Jim Craig
Director, Health Protection
Mississippi State Department of Health
Post Office Box 1700
Jackson, Mississippi 39215-1700

Dear Mr. Craig:

Enclosed is the final version of the Priority Review Report for the Mississippi State Department of Public Health (MSDH) Public Water System Supervision Program (PWSS). As you know, the U.S. Environmental Protection Agency Region 4 Drinking Water Section staff conducted an on-site review of MSDH PWSS program in April 2017. The priority review process was designed to complement previous program-wide data verification audits, by selecting a small number of critical, priority areas in consultation with your staff, completing an in-depth review of those areas and providing observations and recommendations that might best assist the state in optimizing its PWSS program. This report presents the priority selection and review process, and the observations and recommendations identified for each selected program area.

The priorities identified for this review included the implementation of four (4) drinking water rules: The Lead and Copper Rule, Ground Water Rule, Revised Total Coliform Rule and an evaluation of the ultraviolet disinfection treatment provisions of the Long Term 2 Enhanced Surface Water Treatment Rule. Three process-based areas of Mississippi's PWSS Program were also included: enforcement, laboratories, and program implementation.

A report resulting from a Priority Review can be used as a management tool for MSDH and EPA, and as a technical assistance tool for state rule managers and others who are tasked with determining compliance with specific National Primary Drinking Water Regulations (NPDWRs). For this reason, the report includes both summary and detailed information, to meet the very different needs of the potential users of the information.

While the on-site review happened two (2) years ago, we know that the PWSS program has made strides in addressing the challenges and recommendations spotlighted in the report. The report also notes the strong field engineering presence, sanitary survey program and the well targeted deployment of technical assistance resources to the State's water systems. The MSDH drinking water program's November 2018 response to the Draft Priority Review Report is enclosed for your reference.

We hope that the Priority Review Report provides useful information to you in your own evaluation of your MSDH PWSS program implementation. We appreciate the cooperation and assistance of your staff during the priority review process and commend MSDH for its commitment and dedication to

implementing the PWSS program. We encourage MSDH to develop a plan for implementing the EPA's recommendations that you believe will best assist the State in maintaining a strong PWSS program. Should you decide to develop such a plan, we request that a copy be shared with us.

If you have questions regarding any aspect of the report or the review process, please contact me or have a member of your staff contact Mr. Robert Burns, of the Drinking Water Section at (404) 562-9456.

Sincerely,



Jeaneanne M. Gettle, Director
Water Protection Division

Enclosures

Final Report

Public Water System Supervision Program Review

Mississippi State Department of Health

Bureau of Public Water Supply

United States Environmental Protection Agency

Region 4

Water Division

November 15, 2019

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I. EXECUTIVE SUMMARY

Introduction

During the second week of April 2017, the U.S. Environmental Protection Agency Region 4 conducted a Priority Review of Mississippi's Public Water System Supervision (PWSS) Program at the offices of the Mississippi State Department of Health (MSDH), Bureau of Public Water Supply (BPWS) in Jackson, Mississippi. A Priority Review is an oversight approach developed by Region 4 to assess the needs and successes of a primacy agency's implementation of the PWSS Program. Region 4's approach focuses on public health protection and involves an in-depth review of selected components of a state's program.

The priorities identified for this review included four (4) drinking water rules: the Lead and Copper Rule, the Ground Water Rule, an early look at the Revised Total Coliform Rule, and an evaluation of ultraviolet (UV) treatment under the Long Term 2 Enhanced Surface Water Treatment Rule. Additionally, three (3) process-based areas of Mississippi's Program were also included: enforcement, laboratories, and program implementation.

A report resulting from a Priority Review can be used as a management tool for states and the EPA, and as a technical assistance tool for state rule managers and others who are tasked with determining compliance with specific National Primary Drinking Water Regulations (NPDWRs). For this reason, the report includes both summary and detailed information, to meet the very different needs of the potential users.

The EPA's team of reviewers observed strengths and challenges in MSDH's implementation of the specific focus areas (priorities) within the scope of this review. The following is a summary of key findings from the review of each priority area identified. Comprehensive review information for each priority area is in Section III of this report.

Program Implementation

Since the last review in 2008, there has been a change in management within the BPWS. At the time of the onsite portion of the review in April of 2017, MSDH was engaged in training staff to replace key resources that had been permanently or temporarily lost. Complicating this, as was pointed out in the 2008 review, MSDH still does not have written standard operating procedures (SOPs) for determining compliance with the NPDWRs. This makes it difficult for new staff to know what is required for implementation of each drinking water rule. Current MSDH management has identified this as a priority and has begun development of rule-specific SOPs.

Standard Operating Procedure Development Update: MSDH is using FY 2020 multi-purpose grant funds to contract with a Drinking Water Subject Matter Expert to develop Standard Operating Procedures for compliance determination and data entry.

Since the previous review, MSDH has made progress in using information systems to help with implementation of the PWSS Program. Current versions of Safe Drinking Water Information System/State (SDWIS/State) and SDWIS/FedRep are in use, and there are no longer software barriers to the proper validation and reporting of violations.

MSDH has done a good job of making timely quarterly data submittals to the SDWIS/Federal (SDWIS/FED) database. However, it would likely benefit MSDH to make an additional submittal later in the quarter, which would allow compliance determinations to be credited in that quarter's Enforcement Tracking Tool (ETT) report.

MSDH has been successful in building relationships with water system operators via the strong engineering presence of 10 regional engineers. These engineers are responsible for annual inspections, sanitary surveys, and capacity assessments. The assessments produce a score, which can be used to identify and rank systems needing assistance. MSDH's assessment rating has been used as a model for other primacy agencies.

MSDH makes Drinking Water Watch (DWW) publicly available online. This allows the public to directly view real-time information about water systems, analytical results and violations. Nationally, use of DWW has been recognized by EPA as a way for primacy agencies to promote transparency in their regulation of public water systems.

Lead and Copper Rule (LCR)

There is no other drinking water rule, which has captured the attention of the nation as has the LCR. Due to a highly publicized incident in Flint, Michigan, public awareness of the LCR increased. It was soon recognized that Flint was not alone in having lead issues. In Mississippi, the City of Jackson's public water system exceeded the action level for lead during triennial monitoring. Although other systems in the state, and across the Region, also had action level exceedances, Jackson received media attention because of the number of people the system serves (+190,000). Consequently, the LCR was the first priority area identified for review.

Reviewers found that LCR sampling issues identified in the previous (2008) review had been mostly resolved. This is a major improvement since there can be no health protection without appropriate monitoring. However, once the samples are analyzed, and an action level exceedance (ALE) has occurred, reviewers found that MSDH still has issues with ensuring that all post-ALE requirements have been met and appropriately documented, particularly those for corrosion control treatment (CCT), source-water treatment recommendations by systems, state determinations regarding those recommendations, and water quality parameter determinations.

Since about 2015, MSDH has been proactive in ensuring that systems distribute public education (PE) and consumer notices in a timely manner. Of particular note is the State's expectation that systems voluntarily issue consumer notice within 48 hours of receiving lab results.

Due to lack of documentation in the files, reviewers were unable to fully evaluate implementation consistency as it relates to CCT installation. Reviewers did, however, observe instances where systems appeared to stop making overall progress with CCT installation despite multiple ALEs over several years.

Ground Water Rule (GWR)

Implementation of the GWR was selected as a priority area for this review based on its importance in protecting against acute health risks associated with waterborne pathogen exposure from fecal contamination of ground water sources. Additionally, the GWR has particular importance in Mississippi because almost all systems in the State serve water from a groundwater source.

Reviewers found that in most instances where significant deficiencies are noted during sanitary surveys conducted under the GWR, the deficiencies are clearly communicated by MSDH to the affected water system in a timely manner, along with requirements and deadlines for corrective actions. However, there were situations where identified deficiencies were not documented in files as corrected, and MSDH did not issue a violation as expected.

MSDH notifies water systems by phone/email/FAX of the need to collect GWR triggered source water samples in the event they experience positive total coliform results under the Total Coliform Rule (TCR) or Revised Total Coliform Rule (RTCR). In most cases where systems fail to conduct triggered source water monitoring within required timeframes, MSDH is identifying the failure and issuing a monitoring and reporting (M/R) violation as appropriate. However, EPA did encounter one circumstance where a system appeared to fail to conduct required triggered source water monitoring and MSDH did not issue an M/R violation.

Water systems and MSDH do not always share a common understanding of whether the system is complying with the GWR via continuous 4-log treatment, or if the system is subject to triggered source water monitoring requirements in the event of positive total coliform monitoring results under the TCR or RTCR. This delays GWR implementation decision making, which may compromise public health protection.

Reviewers evaluated file information for one system that was required to complete corrective actions in response to a fecal indicator positive triggered source water monitoring result under the GWR. In this case, completion of the corrective actions was documented in State files. MSDH also required the system to conduct assessment source water monitoring. When the assessment source water monitoring was not completed as directed, MSDH did not issue M/R violations as expected.

Revised Total Coliform Rule (RTCR)

The timing of the Priority Review provided an opportunity for Reviewers to evaluate MSDH's implementation of the RTCR just 12 months after water systems were first required to comply with the requirements. Because the RTCR affects all water systems in the State and because it provides protection against contamination that may cause acute health effects, an "early look" at MSDH's implementation was deemed to be a priority.

Reviewers found that, in most cases, water system site sampling plans reflect an appropriate number of samples collected at locations that appear to be representative of distribution system water quality. However, Reviewers identified some situations where site sampling plans show that MSDH is allowing required routine monthly RTCR samples to be collected from sites that may be more representative of source water quality than of distribution system water quality. When systems fail to collect routine samples on schedule, MSDH is issuing monitoring violations as appropriate.

Water systems that incur routine total coliform positive results are generally collecting the correct number of repeat samples from repeat monitoring locations within required timeframes. When routine and repeat monitoring is conducted on schedule, MSDH is effective in determining if an assessment has been triggered and communicating the correct assessment level requirement (Level 1 or Level 2) to the system. However, Reviewers identified situations where systems failed to take repeat samples within required timeframes (and an approved extension is not on file), and MSDH did not notify the system that it had triggered an assessment and/or issue an E. coli Maximum Contaminant Level (MCL) violation as expected.

File documentation examined as part of the Priority Review indicates that both Level 1 and Level 2 assessments are considering required minimum assessment elements. Reviewers encountered one situation where the individual performing a Level 2 Assessment at a water system was not approved to do so (as outlined in the State's RTCR primacy application), and no treatment technique violation was issued as expected. A non-approved individual conducting a Level 2 Assessment without a violation being issued compromises the public health protections offered by the RTCR.

Among water system files examined as part of the Priority Review, all sanitary defects identified during Level 1 assessments were reported as corrected on assessment forms submitted by water systems to MSDH. Reviewers encountered one situation where a Level 2 Assessment form included uncorrected sanitary defects. In this instance, a timetable for correcting the defects was not evident, the defects were not documented as corrected, and no treatment technique or reporting violation was on file as expected.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

LT2ESWTR was recognized early as a potential candidate for this review partly due to attention centered on the City of Jackson water system's LCR ALE, along with the commensurate concern regarding the potential for simultaneous compliance issues at the system. Reviewers chose to focus on the UV treatment component of the LT2ESWTR because UV treatment is complicated in terms of implementation and compliance, and because MSDH, like many other primacy agencies, and Region 4 itself, in this case, may not have resources to completely evaluate the use of this technology. Inclusion of UV treatment as a priority offers the opportunity to link MSDH with EPA's UV expertise outside of Region 4, and is especially timely due to this system's current need to upgrade infrastructure at both of their treatment plants.

The City of Jackson chose to avoid source water monitoring for Cryptosporidium when LT2ESWTR became effective in 2006. There are two (2) consequences of this decision: (1) source water monitoring for Cryptosporidium was never conducted, so it is not currently known whether additional treatment would have been required (and if it was required, at what level), and (2) the system is required to provide the maximum Cryptosporidium treatment (5.5-log) under the LT2ESWTR.

MSDH has not been receiving any reporting on UV treatment from the Jackson system. At a minimum, operators at each plant should be monitoring UV reactors for flow rate, lamp status, and UV intensity as measured by a UV sensor. This monitoring data should be used to calculate the percentage of water entering the distribution system that is not treated by UV reactors operating within validated conditions for the required UV dose. To date, no M/R violation has been issued by MSDH under the LT2ESWTR for failure to report the amount of “off-specification” water delivered to the public.

LT2ESWTR Implementation Update: MSDH developed a Monthly UV Disinfection Operating Report format and provided that to the City of Jackson for reporting. The City of Jackson has been completing the MOR and submitting those to MSDH on time. The Region considers this deficiency to be corrected.

PWSS Enforcement

Evaluation of how primacy agencies utilize enforcement has been a key element of Region 4’s Priority Reviews and was determined to be a priority for the Mississippi Priority Review, as well. The following is a summary of findings regarding MSDH’s enforcement practices.

Reviewers observed that MSDH does not have any written enforcement management strategies or SOPs for the compliance and enforcement program. Consequently, there are no guidelines to promote consistency, and enforcement is essentially handled on a case-by-case basis for each rule. Moreover, without an internal policy, reviewers found it difficult to evaluate MSDH’s activities in relation to the Drinking Water Enforcement Response Policy.

Reviewers observed that MSDH is consistently sending out Notice of Violations (NOVs) along with a request for public notice (PN). The NOV identifies the type of violation and requires the system to provide PN. However, the NOV doesn’t define when the violation occurred or any corrective actions (other than doing the PN) that are required to return to compliance (RTC). The PN was found to be more descriptive than the NOV in most instances, but there were occasions when the PN didn’t identify the timeframe of violation either.

Reviewers found MSDH’s administrative orders (AOs) to be vague about the exact violations that prompted the issuance of the order. Although the type of violation was included, there were often no timeframes provided of when the actual violation(s) occurred. Additionally, the AO required the submission of a compliance plan by a defined timeline that would address the actions to be completed in order to RTC, but did not have any defined final compliance deadlines that were enforceable if not met. This was especially concerning in situations where the order was several years old and continued to be linked to the same violation type with no RTC. This is indicative of a failure to generate an RTC enforcement action. Reviewers observed that MSDH has begun using a more effective “Hearing Process” in order to remedy some of these recognized issues.

In addition to the above concerns with MSDH’s enforcement processes, reviewers also found many discrepancies in data quality in the information found in MSDH’s enforcement documents, information found in SDWIS/State, and information found in SDWIS/FED. As an example, reviewers found that 77 GWR treatment technique violations had not been entered into SDWIS/State, and therefore, were never reported to SDWIS/FED.

Reviewers observed many issues with MSDH’s implementation of the PN Rule. Among those are: timeliness, failure to issue violations, and inconsistent documentation.

PWSS Enforcement Update: Since the time of the March 2017 visit, MSDH has hired an enforcement coordinator with environmental enforcement experience and MSDH has been working with Region 4 enforcement officers to improve the clarity of their administrative enforcement instruments. With the upgrade of SDWIS/STATE to the current version, MSDH has been able to correctly enter and upload the missing information cited in this section. The new standard operating procedures that are in development in 2020 should improve the reliability of enforcement data in SDWIS/STATE.

Laboratories

Evaluation of laboratories used by primacy agencies for compliance with the NPDWRs has been a component of previous Priority Reviews and was determined to be a priority for the Mississippi Priority Review, as well. The following is a summary of findings regarding the laboratories used for drinking water analyses in MSDH's implementation of the PWSS Program.

The Mississippi Public Health Laboratory (MPHL) was assessed by EPA Region 4's Science and Ecosystems Support Division (SESD) in August 2016. Since only minor deficiencies were identified in SESD's assessment, the MPHL will maintain their Certified status through the three-year period, ending August 23, 2019 for chemistry, microbiology, and radiochemistry. Additionally, MSDH's laboratory certification program will maintain the status of Effective in certifying laboratories for drinking water analysis through August 23, 2019.

Laboratory Update: MSDH received a notification from Region 4's Laboratory Services and Applied Science Division on October 2, 2019 that the MPHL was determined to be of Effective status to certify laboratories and certified to conduct drinking water analysis. This certification will be effective for three years.

II. Expectations

After a PWSS program review, state primacy agencies often request that EPA clarify expectations related to specific findings documented in reports. Section III of this report includes comprehensive information for each priority area identified and recommendations for MSDH to consider. MSDH should set its own priorities regarding these recommendations. However, findings that have a direct or indirect public health consequence require MSDH to take immediate action and EPA will monitor the State's progress toward addressing each one. These findings are discussed below.

In the Mississippi Priority Review, reviewers observed that some NPDWR requirements were not being met. In regards, to the LCR, reviewers observed that MSDH was challenged with ensuring that all post-ALE steps are taken and properly documented. One way to address this is to develop an "ALE checklist" that staff can use as a tracking tool for systems with ALEs. Such a checklist could be beneficial in helping to ensure that each ALE-triggered requirement is achieved. Whether MSDH chooses to develop a checklist or not, EPA will expect MSDH to make it a priority to properly document each required step following an ALE. Reviewers observed instances where systems appeared to stop making overall progress with CCT installation despite multiple ALEs over several years. Although systems may cease completing CCT steps in accordance with 141.81(c), those systems must recommence CCT steps after any ALE is incurred thereafter.

In regards, to the GWR, reviewers observed an instance where a significant deficiency identified during a sanitary survey was not communicated to the affected water system with expectations for corrective action, and no documentation was found indicating that the deficiency was corrected. Additionally, reviewers observed an instance where a system appeared to fail to conduct required triggered source water monitoring and MSDH failed to issue a violation. In these cases, water system customers may face unacceptable health risk due to their potential exposure to fecal contamination that is present but not discovered, confirmed, or subsequently addressed through corrective action. Furthermore, with no M/R violation issued, the system is not triggered to notify its customers that it failed to complete the required monitoring – also compromising the public health protections offered by the GWR

In regards, to the RTRC, reviewers observed two (2) instances where site sampling plans show that MSDH is allowing the required routine monthly RTRC sample to be collected at a site that may be more representative of source water quality than of distribution system water quality. Reviewers also identified situations where systems failed to take repeat samples within required timeframes and MSDH did not notify the system that it had triggered an assessment and/or issue an *E. coli* MCL violation as expected. Finally, reviewers observed an instance where a Level 2 Assessment form identified uncorrected sanitary defects. A timetable for correcting the defects was not evident, the defects were not documented as corrected, and no treatment technique or reporting violation was found. Although the EPA recognizes that it is early in the implementation life of the RTRC, MSDH should be mindful that lapses like these may result in acute health risks.

In regards, to the LT2ESWTR, reviewers found that the Jackson system is not providing MSDH with UV information that is required for MSDH to determine compliance, nor has MSDH issued M/R violations for failure to do so. Consequently, it is not currently possible to determine the amount of “off specification” water that is actually delivered, nor are customers notified that the system failed to complete this required monitoring.

In regards, to enforcement, MSDH’s implementation of the PN Rule needs attention. Reviewers found timeliness issues, many instances of MSDH’s failure to issue PN-related violations, and many instances of inconsistent PN documentation. Notification is a key component of the management of health risks. Individuals share in management of their own health risks and simply cannot do so without the information required by the PN Rule.

Additionally, the absence of any clear Enforcement Management System (EMS) or SOPs has resulted in MSDH’s enforcement process being inconsistent, issues with timely and appropriate enforcement, as well as data discrepancies. The enforcement program as a whole is a key component of the primacy agency’s ability to ensure public health protection. MSDH will continue to have difficulty implementing a consistent enforcement program without these written protocols in place.

III. Priority Review Detail

A. Introduction

Staff of the Drinking Water Section in Region 4, along with staff of EPA's Office of Ground Water and Drinking Water (OGWDW) conducted a Priority Review of Mississippi's PWSS Program in Jackson, Mississippi on April 11 – 14, 2017. The onsite review team consisted of Eddy Viveiros and James Hogan from the OGWDW, and Amanda Driskell, Jeannie Williamson, Dale Froneberger, and Brian Thames from Region 4. Additionally, Robert Burns served as advisor for the surface water component of the review. The last review of Mississippi's PWSS Program was conducted by an EPA contractor (Cadmus) in November of 2008; about nine (9) years ago.

Region 4 developed the framework for conducting a Priority Review in 2011 and began conducting reviews in 2012. A Priority Review differs from the Data Verifications and Program Reviews of the past. In a Priority Review, a subset of Drinking Water Rules from the NPDWRs are identified for review instead of reviewing all such Drinking Water Rules as Cadmus had previously done. As originally envisioned, the goal for Region 4's Drinking Water Section was to conduct a review in each state once every three (3) years. In practice, Mississippi is the last state in Region 4 to have a Priority Review conducted in this first round.

In Region 4, reviewers (primarily rule managers) determine the scope and the approach to be taken in reviewing a Rule. Instead of selecting systems for review based on statistics, Region 4 reviewers develop their own list of systems or require the primacy agency to select systems based on identified criteria. For this reason, systems are not reviewed across Rules, there is a system list for each.

The Mississippi Priority Review included a review of four (4) Drinking Water Rules: Lead and Copper Rule (LCR), Ground Water Rule (GWR), Revised Total Coliform Rule (RTCR), and a specific element of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). Other Process-based reviews included: enforcement, laboratories, and program implementation.

Reviewers used one or more of the following methods to obtain information: (1) requests for information prior to the 3-day onsite review, (2) identification of systems for file reviews during the onsite, (3) requests for state-identified systems for file reviews during the onsite, (4) interviews with State staff, and (5) requests for information following the onsite. Table A-1 shows the identified priorities and the method(s) used to gather information for each.

Priority	Requires Information Before Onsite	Has File Review Component	Has Onsite Interview Component	List of Systems Provided by EPA	Requires State to Select Systems
LCR	No	Yes	For clarification	Yes	No
GWR	Yes	Yes	For clarification	Yes	Yes
RTCR	Yes	Yes	For clarification	Yes	Yes
LT2ESWTR	No	Yes	Yes	Yes	No
Enforcement	Yes	Yes	For clarification	Yes	No
Laboratories	No	No	Yes	No	No
Program Summary	No	Yes (Sanitary Surveys only)	Yes	No	Yes (Sanitary Surveys only)

Table A-1. Identified Priorities and Associated Information Requirements

Upon arrival, MSDH provided the reviewers with a dedicated conference room equipped with wireless internet access. MSDH allowed unrestricted access to managers and staff for the entire 3-day period, and reviewers were free to ask staff questions as they arose during the review. MSDH did not provide reviewers direct access to the

local version of SDWIS/State, so the onsite review was limited to paper documents and electronic data retrievals captured by MSDH.

B. Program Implementation Summary

Because of the length of time since the last review, the reviewers took advantage of the opportunity afforded by the onsite to update and clarify EPA's understanding of MSDH's strengths and challenges in implementing the PWSS Program (beyond those associated with the priority areas identified). The previous review was conducted in November of 2008 and is described in the *Final Report, Program Review for the Mississippi State Department of Health, Bureau of Public Water Supply* dated May 26, 2009. As was customary in reviews of the past, the 2009 report included a program summary. That summary was used to guide questions posed to MSDH staff during this Priority Review. The following information is presented in the same order as the 2009 report.

Program Organizational Structure

Mississippi's drinking water regulations were promulgated under the authority of, and pursuant to, the Mississippi Safe Drinking Water Act of 1997 (Section 41-26-1 through Section 41-26-101, Mississippi Code of 1972, Annotated). Regulations for the Bureau of Public Water Supply (BPWS) are found in Part 20 of Title 15 of the Mississippi Administrative Code. Those regulations impact approximately 1195 federally-defined public water systems within the State as shown in Table B-1.

Count	PWS Type	GW/SW	Primary Source
968	CWS	GW	GW
77	CWS	GW	GWP
1	CWS	SW	GU
5	CWS	SW	SW
6	CWS	SW	SWP
73	NTNCWS	GW	GW
1	NTNCWS	GW	GWP
1	NTNCWS	SW	SW
63	TNCWS	GW	GW

Table B-1. Inventory of Active Public Water Systems by Type and Source

PWS, public water system; GW, ground water; SW, surface water; GWP, purchased ground water; CWS, community water system; GU, ground water under the influence of surface water; SWP, purchased surface water; NTNCWS, non-transient non-community water system; TNCWS, transient non-community water system

Almost all aspects of the PWSS Program are accomplished by BPWS. Organizationally, the BPWS is within the Office of Environmental Health, which is within the Office of Health Protection of MSDH. The Public Health Laboratory (PHL), which analyzes most samples for the PWSS Program, reports directly to the State Health Officer and is not in the chain-of-command of the previously mentioned offices of MSDH.

Within the BPWS, six (6) staff make compliance determinations on one or more Drinking Water Rules. This is an increase of one (1) person since the last review, but in that time period, four additional Rules became effective. To the extent possible, MSDH should look for ways to create redundancy in, and facilitate cross training of, the workforce. A conversation with the Health Protection Director indicated that filling some existing vacancies might be possible. There is one attorney assigned to the BPWS, but that attorney's time is divided among other MSDH programs, as well. In practice, the preparation of legal documents remains the responsibility of BPWS staff.

Waiver Information

MSDH currently evaluates and approves waivers only for synthetic organic chemicals (SOCs) based on susceptibility to contamination and actual use. Waivers are no longer granted for volatile organic compounds, and are not granted for inorganic chemicals. Reduced monitoring may be possible for these chemical groups based on sampling results. All systems in the State have asbestos source waivers.

State Assistance

Mississippi has been successful in building relationships with water system operators via the strong engineering presence of 10 regional engineers with assigned areas as shown in Figure B-1. The 10 regional engineers conduct annual inspections and sanitary surveys. In practice, sanitary surveys have an enforceable operational element for significant deficiencies, so inspections which identify significant deficiencies generally become sanitary surveys.

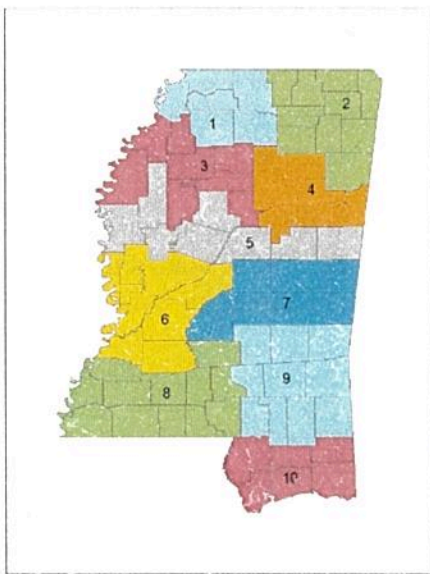


Figure B-1. MSDH Engineering Regions

In this Priority Review, sanitary surveys were actually reviewed for three different purposes: as a required component of the GWR, as a source for population served by water systems (as historically included in previous reviews), and for overall performance by MSDH in conducting sanitary surveys. MSDH's sanitary survey procedures and specific sanitary survey requirements under the GWR are thoroughly described in the GWR portion of the comprehensive reviews in Section D of this document. Although sanitary surveys are not the principal method MSDH uses to acquire system population information, as discussed later, the population information reported by sanitary surveys was checked nevertheless for consistency. In practice, the EPA reviewed 20 sanitary surveys (two (2) for each engineering region) and found that there were no issues with population values reported by sanitary surveys compared with values reported by MSDH's DWW. In this case, the measure was whether a discrepancy between reported population values would alter required actions under a NPDWR. The EPA reviewed the overall performance by MSDH in conducting sanitary surveys. The EPA's CDX Reporting Services now offers a convenient way to see the percentage of systems having a sanitary survey within a three (3) calendar-year period. For calendar years 2014 - 2016, MSDH conducted sanitary surveys for 94 percent of systems. In the previous 3-year period (2013 - 2015), only 75 percent were shown to have been conducted. However, that information was incorrect because MSDH conducted some surveys that were not reported in the SDWIS/FED database. MSDH had effectively resolved this issue before the next calendar-year reporting cycle.

Sanitary surveys are stored electronically in a web-based electronic tracking system (MSWATER), which also houses plans and specifications and associated approvals. This system is not directly linked to SDWIS/State. Regional engineers also conduct capacity assessments of water systems (which are ultimately compiled into an annual report and submitted to the EPA). Those reports have proven to be valuable to the EPA in the evaluation of citizen complaints and have served as a model for other primacy agencies. Criteria used for capacity assessments are reviewed every year by an advisory committee and may be adjusted accordingly. At the state level, capacity assessments are used to target systems in need of assistance. This assistance is often provided in the form of loans from the Drinking Water State Revolving Fund (DWSRF). Unfortunately, this year the legislature failed to appropriate the required DWSRF state matching funds, which would have diminished Mississippi's ability to meet the needs of challenged water systems. However, by the time this report was drafted, this issue had been resolved.

In regards, to managerial capacity, Mississippi law requires persons serving on a governing board of any community public water system serving a population less than or equal to 10,000, to attend management training. However, MSDH reports that it has been challenging to get board members to attend the training.

All public water systems are charged a fee based on the number of service connections. Since the last review, there was a slight increase in this fee (now \$2.80 per service connection). Sometimes MSDH uses "equivalent connections" (based on population) for large water users having few connections. The maximum fee is \$40,000. In addition to the PWSS grant, the BPWS also receives a 10 percent administrative set-aside from the DWSRF.

As pointed out in the 2009 report, MSDH did not have written SOPs, and still doesn't. However, under the current administration, developing SOPs for the Drinking Water Rules has been made a priority. At the time of this Priority Review MSDH was considering adapting Virginia's PWSS Program SOPs for Mississippi's use.

State Data System

The active public water systems in MSDH's inventory is shown in Table B-1. Note that only seven (7) systems use surface water as a primary source (highlighted). Since sample schedules for many Drinking Water Rules are based on the population served, keeping the population value current is important to proper compliance determination. This Priority Review included a review of sanitary survey population values as described above. Although sanitary surveys/annual inspections and MSDH's plan review process all offer opportunities to check on population values, the primary means of acquiring this information is via an annual inventory submitted by systems to MSDH. The State is looking into the possibility of using their website to capture this information directly from the systems. Ultimately, inventory information is stored electronically in SDWIS/State, which is the database of record for MSDH's implementation of the PWSS Program.

Although there have been some issues with support for MSDH's implementation of SDWIS/State, both SDWIS/State and FedRep are now at the current version (3.33 and 3.51 respectively), so there are no software barriers to the proper validation and reporting of violations. MSDH does not use SDWIS/State to determine compliance with the surface water treatment rules or radionuclides.

MSDH sponsors DWW online. This utility allows the public to directly view real time information on water systems, analytical results, and violations. Nationwide, the EPA recognizes the benefit of a primacy agency's use of DWW in the increased transparency that it allows.

Mississippi has done a good job of making timely quarterly data submittals. Although that schedule is based on a requirement to send submissions 45 days after the most recent compliance quarter, that single submittal (at day 45) is often too soon to capture compliance determinations made by a state. This is the reason that the EPA encourages states to submit actions and samples data again before the end of the quarter. Mississippi might consider, for example, establishing an arbitrary schedule for a second submittal 30 days later, or establishing a schedule based on actual experience.

EPA's CDX Reporting Services includes a module called the "Data Quality Matrix" which provides some basic measures of a primacy agency's data quality in the SDWIS/FED database. The inventory portion of the Data Quality Matrix reports good overall data quality for MSDH. Independently, reviewers ran queries of the federal data warehouse and found only minor issues as summarized in Table B-2. System specific PWSIDs are provided, along with category affiliation, in Table B-3.

Data Quality Category	Facility Count	System Count
Active facilities for inactive systems	125	41
Treatment plant facilities with no location coordinates	16	13
Source facilities with no location coordinates	2	1
Source facilities outside state boundary	5	4

Table B-2. Data Quality Categories with Associated Facility/System Count

Data Quality Category	PWSID
Active facilities for inactive systems	MS0080018
	MS0110019
	MS0140024
	MS0140048
	MS0150017
	MS0180020
	MS0190002
	MS0190012
	MS0230012
	MS0240144
	MS0240243
	MS0250009
	MS0250093
	MS0300028
	MS0300037
	MS0300069
	MS0300084
	MS0300158
	MS0360038
	MS0380081
	MS0380114
	MS0410028
	MS0410031
	MS0420033
	MS0440029
	MS0440041
	MS0440079
	MS0470088
	MS0490021
	MS0500012
	MS0500016
	MS0520025
	MS0530011
	MS0530015
	MS0540064
	MS0540070
	MS0620024
	MS0620025
	MS0640020
	MS0740058
	MS0760074
	MS0780020
Treatment plant facilities with no location coordinates	MS0120027
	MS0160001
	MS0160011

	MS0220067
	MS0230069
	MS0250015
	MS0310011
	MS0310016
	MS0340020
	MS0380001
	MS0410024
	MS0590008
	MS0730009
Source facilities with no location coordinates	MS0410024
Source facilities outside state boundary	MS0180008
	MS0230069
	MS0590007
	MS0730009

Table B-3. Data Quality Categories with Associated System IDs

Sample Collection, Analysis, and Laboratory Certification

Since this Priority Review included a laboratory component, information on laboratory certification is found in Section H. The following is a cursory description of the way MSDH handles samples collected for compliance monitoring.

MSDH's business practice for chemical monitoring is very different from that of most other primacy agencies. MSDH does not provide sample schedules to systems. Instead, sample bottles with instructions are sent (via commercial shipping) to systems when monitoring is required. Systems then conduct the sampling and return the sample bottles to Mississippi's Public Health Laboratory (MPHL) via return commercial shipping.

The BPWS uses a web-based administration tool (phpPgAdmin) to query SDWIS/State and determine when to coordinate the sending of sample bottles to systems. Information from the query is captured in comma-separated value format and imported into Excel, then a mail merge is done to generate sample letters in Word format.

Due to the frequency of bacteriological monitoring, water systems obtain sample bottles from local health department offices. Systems then conduct the sampling and return sample bottles to the local health department, where a courier service collects them and delivers them to the MPHL.

Regarding analytical results, the MPHL currently captures results for compliance samples in LabWare, which is MPHL's Laboratory Information Management System (LIMS). From LabWare, results are automatically imported into SDWIS/State. Soon, the MPHL will be exclusively using ApolloLIMS as noted in Section H of this report. When systems use a laboratory other than the MPHL, analytical results are typically emailed to the BPWS, and then loaded into SDWIS/State. Some results are still received as paper documents (e.g. physical/chemical well data, bromate/bromide, SOCs, data from some contract laboratories) and are entered manually into SDWIS/State.

C. Lead and Copper Rule

This section outlines the review team's findings as it relates to successes and challenges with LCR implementation. The purpose of the LCR review was to:

- Evaluate the extent to which compliance information in MSDH's files and databases are correctly represented in SDWIS/FED,
- Determine whether MSDH compliance determinations are conducted in accordance with LCR requirements,
- Determine whether MSDH has implemented EPA recommendations identified during past reviews and
- Identify opportunities through which EPA can assist primacy agencies in enhancing LCR implementation.

For the review, the reviewers examined a stratified, random sample of systems with the intention that it would provide representative insight into MSDH implementation of the LCR. Table C-1 provides an overview of the State PWS inventory and the number of systems reviewed. The distribution of these systems generally matched that of the overall inventory and included five systems that had recently exceeded the lead action level.

System Size (Population Served)	Inventory ¹	Proportion of All PWSs ¹	Number Reviewed	Proportion of Reviewed PWSs
Small (≤ 3,300)	998	83%	20	80%
Medium (> 3,300 to 50,000)	204	17%	4	16%
Large (> 50,000)	3	0.25%	1	4%
Total	1,205	100%	25	100%

¹ All systems, including those not subject to the LCR (i.e., TNCWSs). Eliminating TNCWSs from the leftmost column yields: 935 small (82 percent), 203 medium (18 percent) and 3 large systems (0.26 percent).

Table C-1. Number and Distribution of State Inventory and PWSs Reviewed

Table C-2 provides a tabular summary of any identified data discrepancies between state and federal records, or errors in compliance determination. Table C-3 (at the end of this Section) details, by system, each discrepancy identified during the review.

Rule	Compliance Determination (CD)		Data Flow (DF) ¹	
	M/R	MCL/TT	M/R	MCL/TT
LCR	CWS: 11 NTNCWS: 2	CWS: 7 NTNCWS: 3	CWS: 1 NTNCWS: None	CWS: None NTNCWS: None

¹ Data flow discrepancies are assigned if the state correctly identified and assigned a violation but did not report the violation to SDWIS/FED as required.

Table C-2. Summary of Identified Discrepancies

File Review Methodology for LCR

To meet the objectives identified above, reviewers evaluated hard copy files for the selected systems and compared the information against the most recently frozen SDWIS/FED data set. Due to technical constraints, reviewers were unable to access compliance information stored within MSDH's electronic databases. Where necessary, MSDH staff retrieved the requested information and provided the review team with printouts of query results.

The review period covered the two (2) most recent rounds of sampling for which SDWIS data were available. Specifically, the first and second halves of 2016 for systems on six-month monitoring, 2015 and 2016 for systems on annual monitoring and the two (2) most recent three-year periods ending prior to 2017 for systems on triennial monitoring. For systems with multiple ALEs, the review period for follow up actions was traced back to the original ALE. In some instances, this required the review of additional sampling periods beyond the two (2) most recent rounds. This allowed reviewers to more fully evaluate the extent to which follow-up actions were conducted in accordance with rule requirements.

For all systems, the review covered the following LCR-related activities:

- Lead and copper tap monitoring:
 - Determining whether the minimum number of lead/copper tap samples were collected,
 - Determining that these samples were collected during the proper time period,
 - Verifying 90th percentile calculations for lead and copper,
 - Reviewing consistency of sample sites between first and second monitoring periods and state documentation of any changes,
 - Conducting a cursory review of monitoring plans to verify sample collection from highest tier sites and
 - Conducting a cursory review of compliance with consumer notices and Consumer Confidence Report requirements.
- Water quality parameter (WQP) monitoring (where applicable):
 - Ensuring WQPs were collected at both the distribution system (i.e., customers' taps) and at entry points to the distribution system,
 - Determining whether the minimum number of samples were collected and
 - Determining whether these samples were collected during the proper time period.

For PWSs with ALEs, reviewers evaluated the following additional activities:

- Delivery and timely reporting of public education,
- Timely completion of source water treatment steps and associated reporting requirements and
- Timely completion of CCT steps and associated reporting requirements.

Finally, for the City of Jackson, reviewers conducted an additional review of the following:

- Number of WQP excursions per monitoring period and
- Completion of any applicable steps/actions related to lead service line replacement requirements.

Overview of LCR Implementation by the Primacy Agency

The MSDH central office oversees LCR implementation and ensures compliance and consistency across the State. A LCR coordinator has recently been appointed to assist district engineers with implementation questions, offering further opportunities for the PWSS Program to proactively promote consistency state wide. LCR site-

sampling plans for lead and copper are reviewed by the central MSDH office. This office also oversees compliance with public education and consumer notice requirements. Ninetieth percentile values are calculated by SDWIS/State. WQP monitoring, corrosion control and source water treatment requirements are overseen by engineers at the state district level, with support from the LCR coordinator. When a system exceeds the action level, MSDH notifies the system of this occurrence and request that follow up steps to be taken. The MSDH strives to notify systems within 48 hours of determining an ALE.

Lead and copper samples, whose collection costs are generally covered by the State, are analyzed by the State laboratory and reported to MSDH via a LMS system to SDWIS/State. The State lab provides sample bottles and detailed instructions to those water systems that are required to monitor for lead and copper. Water systems forward the collected samples to the State lab via couriers that are set up at each county's health department office. Some systems may opt instead to have samples analyzed by a commercial laboratory. In these cases, the systems pay out of pocket for lab analyses and do not receive sampling assistance from MSDH.

Lead and Copper Rule Successes and Challenges

Implementation appears to be effective in the following areas:

- Lead and copper tap samples are collected on time, for the appropriate number of sites and from locations that are consistent with sampling plans. This appears to be a notable improvement over the 2008 Program Review.
- Since about 2015, MSDH has been proactive in ensuring systems distribute public education (PE), collect source water samples and distribute consumer notices in a timely manner. Of particular note is the State's expectation that systems voluntarily issue consumer notice within 48 hours of receiving lab results. **(Under the LCR, water systems must provide consumer notice no later than 30 days after learning of the results.)**
- For water systems with ALEs, MSDH delivers a standardized set of instructions and certification forms delineating required next steps under the LCR after an exceedance occurs (e.g., public education). The forms are also used as a tool for non-ALE systems when delivering consumer notices.
- MSDH has worked proactively to develop site validation worksheets and questionnaires that systems can use as a tool for updating their materials inventories and verifying sampling tier designations for homes.
- ALE notifications from MSDH do not always go to the water system operator who handles the notification process, causing a time lag between the notified individual and the operator charged with coordinating compliance with the triggered requirements. MSDH has been working proactively to resolve this issue by copying the operator on correspondence to the legally responsible official, to ensure action by the water system as soon as possible.

Implementation appears to be a challenge in the following areas:

- ALE-triggered rule requirements do not appear to be implemented consistently. Areas for improvement include:
 - Ensuring completion of CCT steps applicable to the system (e.g., corrosion control studies, treatment installation or State designation of optimal water quality parameters (OWQPs)).
 - Records of systems' source water treatment recommendations and subsequent State determinations were not found. MSDH indicated the treatment recommendations and State determinations were communicated verbally. Per 141.83(b), any system with an ALE must

make a recommendation to the State in writing, even if it is to recommend no treatment. The State must notify the system in writing of its determination and supporting basis.

- An attempt was made to augment the file review protocol with a cursory review of WQP-related compliance determinations; however, WQP results were not found in the system files. Per 141.87(a), systems must report all WQP samples within the first 10 days following the end of each applicable monitoring period.
- Regarding overall coordination between the state lab, MSDH and water systems, samples generally are analyzed fairly quickly upon receipt by the lab; however, several instances were identified where results were not reported to MSDH until weeks or even months later. MSDH has worked to improve coordination with the lab. Improvements were observed for monitoring periods following the City of Jackson's 2015 ALE.
- For the City of Jackson:
 - Delayed notification by MSDH of the PWS's lead ALE. Samples were collected in June 2015. State lab analysis results were available to MSDH in July 2015 for the sample period ending September 20, 2015. The PWS was not notified of the results until January 28, 2016.
 - Inconsistent reporting of WQPs. Per conversations with MSDH staff, the PWS did not report WQPs directly to the State until February 2016. Before that, WQPs were stored at the PWS and reviewed by MSDH district engineers during periodic field visits. Per 40 CFR 141.90(a)(1), systems are to report WQPs "within the first 10 days following the end of each applicable monitoring period." The City of Jackson's approach was not consistent with rule requirements; thus it was actually out of compliance until 2016.
 - Reviewers were unable to confirm that MSDH set optimal water quality parameters (OWQPs) independently for entry points vs. taps for the City of Jackson. Instead, it appears one set of OWQPs was designated and applied to both. Levels measured at the entry point are generally expected to change as they travel through the distribution system.
 - The City of Jackson incurred excursion-related violations for WQPs during the January thru June and July thru December 2016 monitoring periods. MSDH assessed a violation for the first, but not the second monitoring period. No violations were found in SDWIS/State or SDWIS/FED.
 - Reviewers were unable to locate the City of Jackson's source water treatment recommendation.
 - No documentation was found for MSDH's source water treatment determination (overlaps with general finding discussed above). MSDH indicated its conclusion was "no treatment required." Reviewers were unable to verify when this determination was communicated to the PWS.
 - The City of Jackson was required to proceed with lead service line (LSL) replacement. Documentation was not found demonstrating the system's compliance with associated rule requirements, whether through physical replacement or by demonstrating to MSDH that no LSLs are present in the system. Per 40 CFR 141.90(e), a system must submit written documentation to the State of the material evaluation, identify the initial number of LSLs in its distribution system at the time the lead action level is exceeded and provide an LSL replacement schedule.

Lastly, reviewers compared the results of this LCR review to the Program Review completed in 2008. Reviewers noted several improvements, however some of the same issues remain.

- The 2008 review noted significant issues with monitoring. It was noted that MSDH did not assess violations for systems failing to collect samples, or for those that collected samples outside the summer months required for annual and triennial monitoring periods. Also noted were challenges in ensuring that PWSs follow site sampling plans and lack of oversight related to delivery of consumer notices to homeowners. All of these issues appear to have been addressed.
- The previous file review noted significant issues with ensuring timely analysis and reporting from the State Lab for lead and copper as well as WQPs, apparently due to a lack of capacity. It appears to the review team that samples are now issued in a timely manner, however issues remain with ensuring that results are communicated quickly from the Lab to MSDH and, ultimately, to the PWS to ensure appropriate follow up actions are initiated.
- The 2008 review noted that field engineers will be responsible for reviewing long-term changes in treatment as well as reviewing WQPs. It appears this is still the case; it also appears decision-making is decentralized, as staff in Jackson were unable to provide details of actions taken with these systems.
- Finally, for systems with lead ALEs, the 2008 review noted that:

“Systems have not collected water quality parameters (WQPs) or source water samples, have not been instructed to make corrosion control or source water treatment recommendations, or provide public education (PE) for lead ALEs. Violations have also not been assigned or reported to SDWIS/FED. While on-site, the team recommended that MSDH review all systems with ALEs and ensure that follow-up steps are taken. MSDH has recently hired a dedicated LCR rule manager and has been working to correct these deficiencies. During November 2008, MSDH identified all systems with previous ALEs, drafted letters with follow-up monitoring instructions, and is currently preparing PE templates for systems to forward to its customers.”

While reviewers noted some improvement, including timely notice of PE and source water sample reporting, other issues appear to remain, such as submission of corrosion control and/or source water treatment recommendations and WQP collection and reporting.

Interview of MSDH Management

Reviewers discussed with MSDH management LCR implementation and notification processes, and their lessons learned following the Jackson ALE. Below are the highlights of this discussion.

- MSDH has shortened their notification timeframe since the Jackson ALE, in an effort to get the notifications to the systems as quickly as possible when there is an ALE. MSDH also found that there have been delays in communicating the ALEs to operators. MSDH’s new process includes sending the results directly to the operator, in addition to the water system’s legally responsible official, to ensure there’s no lag time between system officials, personnel and operators.
- Another useful process that MSDH has developed is the ALE notification packets designed to assist the operators. These packets contain instructions and certification forms that delineate the required next steps under the LCR after an ALE. MSDH has simplified the process and provided more guidance to assist the systems with ALE follow up steps, including public notifications and education.
- Reviewers also discussed with MSDH the concern that a PWS may be able to “test out” when the system experience multiple non-consecutive ALEs. MSDH management stated they have not found that their systems are able to “test out” of the multiple non-consecutive ALEs, although reviewers did find evidence of systems that were continuing to monitor at an increased frequency, but did not perform the necessary

steps required by the rule after incurring an ALE, such as beginning to develop optimal corrosion control for small systems.

- When there is a change in source water or treatment made to the system, MSDH must be notified by the water system and the changes must be approved by MSDH. If the water system is new or planning to switch water sources, MSDH will analyze the information and issue approvals.
- When discussing the Jackson ALE, MSDH pointed out a few things they will strive for in the future. For instance, they would like to educate decision-makers on the responsibilities placed on MSDH and PWSs to meet all safe drinking water standards. MSDH has identified the areas where children congregate as an area of interest for LCR testing and offered free testing in Jackson. Since the testing in schools and daycare facilities are not required, some of the schools are reluctant to submit samples and have the results available to the public. MSDH will continue to offer the free testing and encourage schools and daycares to obtain LCR testing for their facility.

Recommendations

1. MSDH encounters ALEs on a relatively infrequent basis, which appears to be a contributing factor to the inconsistencies observed in the implementation of rule requirements. In light of this, the State has recently dedicated a position to focus on LCR implementation. This position should help ensure more robust and consistent implementation of rule requirements in the wake of an ALE. The EPA encourages this approach and will provide contact information for Region 4 or EPA Headquarters' staff when there are questions regarding LCR implementation.
2. Due to lack of documentation in the files, reviewers were unable to fully evaluate implementation consistency as it relates to CCT installation. The team did, however, observe instances where systems appeared to stop making overall progress with CCT installation despite multiple ALEs over several years. While systems may cease completing CCT steps in accordance with 141.81(c), they are also required to recommence completion after any ALE is incurred thereafter. For the benefit of promoting public health, and to minimize ALE recurrence, it is strongly recommended that water systems with recurring ALEs complete CCT installation.
3. Similar to a recommendation made in the 2008 review, MSDH should consider developing a concise "ALE checklist" that staff can leverage as a simple tracking tool for systems with ALEs. The checklist would:
 - Delineate each ALE-triggered requirement for a given system and automatically compute "complete/report by" dates based on user input.
 - Provide staff with technical support on rule fundamentals while simultaneously enhancing implementation consistency state-wide.
4. As noted in the 2008 file review, systems with outstanding ALEs should be required to begin WQP and source water sampling immediately and should begin preparing treatment recommendations. All large systems need to report WQPs to the State, and this, generally, has not been happening.

PWS Number	PWS Name	PWS Type	Rule	Violation or Compliance Period Begin Date	Question	Supplemental Details	State Response	Discrepancy Resolution
MS0250008	CITY OF JACKSON	CWS	LCR	7/1/16	System had >9 excursion days for WQPs – why wasn't a violation assigned?			
MS0250008	CITY OF JACKSON	CWS	LCR	7/1/16	No source water treatment recommendation found – why wasn't a violation assigned?			
MS0250008	CITY OF JACKSON	CWS	LCR	10/1/16	No LSLR documentation, report found – why wasn't a violation assigned?			
MS0690012	Senatobia Lakes Estates, INC	CWS	LCR	3/1/15	Failure to issue violation for timely PE notice	Follow up PE have been timely		
MS0690012	Senatobia Lakes Estates, INC	CWS	LCR	1/10/15	Failure to require WQP data collection for both the source and the system	Does not appear to have been done for subsequent ALEs either		
MS0690012	Senatobia Lakes Estates, INC	CWS	LCR	7/1/15	Failure to issue violation for timely completion of source water sampling	Follow up source water sampling was done timely		
MS0690012	Senatobia Lakes Estates, INC	CWS	LCR	7/1/15	No documentation of source water treatment recommendation from PWS			
MS0690012	Senatobia Lakes Estates, INC	CWS	LCR	7/1/15	Unclear if state made the determination that a CCT study was required or alternately determined the CCT to be installed			
MS0560013	Leaf River Cellulose, LLC	NTCWS	LCR	12/31/2012	Cu ALE was exceeded in second half of 2012 however was not reported to SDWIS/FED (3.1 mg/L)			

PWS Number	PWS Name	PWS Type	Rule	Violation or Compliance Period Begin Date	Question	Supplemental Details	State Response	Discrepancy Resolution
MS0560013	Leaf River Cellulose, LLC	NTCWS	LCR	1/10/13	Failure to require WQP data collection for both the source and the system	Does not appear to have been done for subsequent ALEs either		
MS0560013	Leaf River Cellulose, LLC	NTCWS	LCR	3/1/13	Failure to issue violation for timely completion of PE requirements	Follow up PE have been timely		
MS0560013	Leaf River Cellulose, LLC	NTCWS	LCR	7/1/13	No documentation of source water treatment recommendation from PWS			
MS0560013	Leaf River Cellulose, LLC	NTCWS	LCR	12/31/13	Unclear if state made the determination that a CCT study was required or alternately determined the CCT to be installed			
MS0490006	North District 1 Water Assn	CWS	LCR	3/1/15	Failure to issue violation for timely PE notice	Follow up PE have been timely		
MS0490006	North District 1 Water Assn	CWS	LCR	1/10/15	Failure to require WQP data collection for both the source and the system	Does not appear to have been done for subsequent ALEs either		
MS0490006	North District 1 Water Assn	CWS	LCR	7/1/15	Failure to issue violation for timely completion of source water sampling	Follow up source water sampling was done timely		
MS0490006	North District 1 Water Assn	CWS	LCR	7/1/15	No documentation of source water treatment recommendation from PWS			
MS0490006	North District 1 Water Assn	CWS	LCR	12/31/15	Unclear if state made the determination that a CCT study was required or alternately determined the CCT to be installed			
MS0300163	Helena Utility District	CWS	LCR	4/01/17	Failure to require initial WQP for the system			
MS0300163	Helena Utility District	CWS	LCR	11/01/16	Failure to require WQP samples at the entry point and taps			

PWS Number	PWS Name	PWS Type	Rule	Violation or Compliance Period Begin Date	Question	Supplemental Details	State Response	Discrepancy Resolution
MS03000163	Helena Utility District	CWS	LCR	4/1/17	No documentation of source water treatment recommendation from PWS			
MS03000163	Helena Utility District	CWS	LCR	7/1/17	Determination not made by the state that a CCT study was required or alternately determined the CCT to be installed			
MS0760074	Lake Jackson Water Association	CWS	LCR	12/31/2014	Failure to monitor for LCR during 2009-2011 monitoring period, no violation issued			

Table C-3. Summary of Discrepancies Identified by System

D. Ground Water Rule

Background

Implementation of the GWR was selected as a priority for review based on the rule's importance in protecting against acute health risks associated with waterborne pathogen exposure from fecal contamination of ground water sources and the fact that Mississippi has many groundwater systems. This review marks the EPA Region 4's first evaluation of MSDH's implementation of the GWR.

The EPA promulgated the GWR on November 8, 2006. The rule establishes a risk-targeted approach to identify ground water systems with sources that are susceptible to fecal contamination. Those systems identified as at risk of contamination are required to take corrective action to protect consumers from potentially pathogenic bacteria and viruses. The rule applies to PWS (including consecutive systems) that use ground water as a source, unless each of the system's ground water sources are adequately treated before the water is delivered to customers. Major components of the GWR include: (1) sanitary surveys and associated corrective action; (2) source water monitoring and associated corrective action; and (3) treatment that reliably provides 4-log inactivation/removal of viruses.

Water systems subject to the GWR were required to comply beginning on December 1, 2009. At that time, Mississippi lacked state authority to implement the rule independent of the federal regulatory framework. Under a primacy extension agreement that was effective on September 26, 2008, MSDH first implemented the GWR by applying the federal rule provisions to affected water systems in Mississippi. Mississippi's Primary Drinking Water Regulations corresponding to the federal GWR were effective on August 23, 2012. With MSDH's submission of a complete primacy application to the EPA, the State obtained interim primacy for the rule on November 8, 2012. On August 25, 2014, the EPA designated Mississippi as having final primacy for the GWR.

Of the approximately 1190 PWSs in Mississippi subject to GWR requirements, SDWIS/FED shows that 31 PWSs have incurred GWR violations since the effective date of the rule. Each of the violations recorded in SDWIS/FED is a M/R violation. MSDH has acknowledged that 77 treatment technique (TT) violations incurred by an additional 72 water system have not yet been uploaded to SDWIS/FED due to delays it experienced in installing the current version of SDWIS/State and its loss of multiple key State employees during 2016. Two (2) systems have been issued both M/R and TT violations. This translates to 92 percent of affected systems on record as having remained in compliance with the GWR since the rule became effective.

The GWR uses treatment techniques, rather than MCLs, as a basis for compliance. Implementation of the rule at each water system requires active engagement by State personnel – through sanitary surveys, reviews of monitoring results and treatment data, as well as communication with water systems – to identify situations that may represent risk of fecal contamination and to track completion of acceptable corrective actions within required timeframes. If identified risks are not documented as corrected, the EPA expects that violations will be issued. Considering that MSDH relies on staff from ten different regional offices and its central office to implement the GWR, the Priority Review focused on determining whether the State is applying an appropriate and consistent approach for identifying risk situations to water systems, and then appropriately tracking correction of identified risks and issuing violations when appropriate.

Scope of Review

In reviewing MSDH's implementation of the GWR, responses to questions focusing on procedural issues, including those related to sanitary surveys and required follow-up, data flow, compliance determinations, and tracking were gathered. Monitoring data and hardcopy files for 12 water systems in Mississippi were also examined to evaluate how the policies and procedures affect implementation across the three (3) major rule components.

- Sanitary Surveys and Associated Corrective Action

States are required to conduct sanitary surveys of all ground water systems in order to identify significant deficiencies, which may make a system susceptible to fecal contamination. Sanitary surveys include an onsite review of eight water system components. They are expected to be conducted every three (3) years for most CWS and every five (5) years for

all NCWS and those CWS that provide 4-log treatment of viruses or that have an outstanding performance record. If a significant deficiency is identified during the sanitary survey, within 30 days the State must communicate the deficiency to the water system. Within 30 days of notification of the deficiency, the system must consult with the State about an appropriate corrective action. Within 120 days of notification, the system must complete the corrective action or be in compliance with a state-approved corrective action schedule.

For the Priority Review, documentation of sanitary surveys and associated corrective actions (when required) was evaluated for 10 water systems.

- Source Water Monitoring and Associated Corrective Action

Ground water systems that do not provide 4-log treatment of viruses for each ground water source must collect at least one sample from each source within 24 hours of being notified of a routine total coliform positive distribution system sample collected under the Total Coliform Rule (TCR; prior to April 1, 2016) or Revised Total Coliform Rule (RTCR; on or after April 1, 2016). The triggered source water sample must be analyzed for the presence of a fecal indicator. If the sample is fecal indicator positive, public health risk exists and the system must either take corrective action, as directed by the State, or if corrective action is not required, the system must collect five (5) additional samples from each source. If the State directs corrective action after the first fecal indicator positive source water sample or if any of the additional samples is fecal indicator positive, the system must complete corrective action or be in compliance with a state-approved corrective action schedule within 120 days. The State may also require systems with sources that seem susceptible to fecal contamination to conduct assessment source water monitoring. When assessment source water monitoring results show the presence of fecal contamination, follow-up requirements are the same as for fecal indicator positive triggered source water monitoring results.

Monitoring data and other documentation associated with situations where systems were required to conduct source water monitoring was evaluated for nine (9) water systems. For one (1) of the systems, examined data suggest that corrective action was also required, and MSDH's implementation of these requirements was considered in the evaluation.

- 4-log Treatment

In order to not be subject to triggered source water monitoring requirements of the GWR, a ground water system can demonstrate to the State that it provides treatment that reliably achieves at least 4-log inactivation or removal of viruses at or before the water reaches the system's first customer. Also, adding continuous 4-log treatment may be an acceptable corrective action in response to a sanitary survey significant deficiency or fecal indicator positive source water monitoring results. Once a demonstration of 4-log treatment capability is accepted by the State, the system must monitor and document the effectiveness of its treatment process. Generally, effective treatment is achieved by a system maintaining a minimum residual disinfectant concentration at a compliance point established or approved by the State. Any lapse in maintaining 4-log treatment is considered a risk to public health and must be corrected within 4 hours of its discovery by the system.

Documentation reported to MSDH in association with 4-log treatment was evaluated for three (3) water systems. Two (2) of the systems appear to have discontinued 4-log treatment at some point since the GWR went into effect, and MSDH's implementation of requirements associated with discontinuing the treatment were also considered in evaluations of these two (2) systems.

Key Observations

Within MSDH, each of ten (10) regional offices is assigned one (1) BPWS engineer who is responsible for conducting annual inspections and sanitary surveys for approximately 120 water systems. The Bureau's Engineering Director, stationed at the central office in Jackson, prepares the survey schedule and provides it to each regional engineer. Under an approach more protective than the federal GWR framework, all categories of PWSs in Mississippi are scheduled to have a sanitary survey completed every three (3) years, and MSDH is adhering to this schedule. Regional engineers complete their assigned inspections and scheduled sanitary surveys between July 1 and June 30 each year (state fiscal year).

Regional office supervisors periodically check the inspection and survey status of the engineers they supervise to ensure the schedule is maintained, and employee job performance ratings are based, in part, on completion of annual inspections and sanitary surveys. New regional engineers are accompanied by their immediate supervisor at all annual inspections and sanitary surveys during their first three months on the job. At the end of the 3-month period, the new engineer is considered qualified to perform inspections and sanitary surveys independently; however, the supervisor remains available for support as needed.

Both annual inspections and sanitary surveys have the potential to reveal significant deficiencies. However, when new significant deficiencies are identified during an annual inspection, the inspection is generally reclassified as a sanitary survey. For CWSs and NTNCWSs, the Bureau utilizes its Capacity Assessment Rating (CAR) form to evaluate technical, managerial, and financial capacity as part of annual inspections and sanitary surveys. With a standard evaluation template, the CAR scores each system on a scale of 0.0 to 5.0. The ratings system aids MSDH in identifying those systems that are at risk of becoming unable to provide safe drinking water to their customers, and many of the elements of the CAR overlap with the eight required components of GWR sanitary surveys.

Prior to annual inspections and sanitary surveys, the assigned MSDH regional engineer provides CWSs and NTNCWSs with a checklist that outlines the CAR criteria that will be used as part of the evaluation. All systems, including transient non-community systems, are notified of how they can gain online access to significant deficiency criteria that the regional engineers also use in performing their work. Regional engineers review past inspection and sanitary survey reports, as well as the system's recent compliance history, to remind them of previous areas of concern. Along with the CAR form (where applicable), two (2) separate lists of significant deficiencies guide inspections and sanitary surveys. One list is utilized for CWSs and NTNCWSs, while a modified list is used for transient non-community water systems to better fit the operational structure, management, and water use patterns typical of these systems. Each list includes multiple examples of significant deficiencies under each of the eight (8) sanitary survey components, and inspectors examine each of the applicable elements of water system operation to determine if any of the example significant deficiencies exist. Inspectors also use their best professional judgement in determining whether an identified deficiency represents a serious public health threat and thus meets the State's definition of "significant". Most commonly identified significant deficiencies among Mississippi water systems include: (1) inadequate internal cleaning/maintenance of storage tanks, (2) lack of redundant mechanical components where treatment is required, and (3) improperly constructed wells.

After the site visit, regional engineers follow an SOP to generate an inspection or sanitary survey report from a report generator application module of SDWIS/State, and they enter identified significant deficiencies into the data system. After approval by the engineer's supervisor, the report is forwarded electronically to the SWTR/GWR compliance manager in the central office. The SWTR/GWR compliance manager reviews and approves the report before printing, signing, and mailing it to the water system. When significant deficiencies are identified, a separate significant deficiency notification report is generally mailed to the water system within 30 days of the site visit, along with the inspection or survey report itself. The significant deficiency notification report presents corrective action requirements and deadlines. Through SDWIS queries and Excel spreadsheets, the SWTR/GWR compliance manager tracks the corrective status of identified significant deficiencies and alerts regional engineers when deadlines are nearing. In turn, regional engineers consult with water systems on corrective actions, remind systems of corrective action deadlines, and document completion of required work. When corrective actions will require more than 120 days to complete, MSDH often enters into Bilateral Compliance Agreements (BCAs) with affected systems, and the signed BCAs serve as State-approved corrective action schedules.

Where sanitary surveys include CAR forms, it is clear that each of the eight (8) water system components required to be evaluated under the GWR is being considered as part of the survey. For transient systems where no CAR is conducted as part of the sanitary survey, it is somewhat more difficult to confirm that each of the eight (8) required elements is included in the sanitary survey evaluation because only those elements with identified deficiencies are described in the sanitary survey reports shared with the EPA as part of this Priority Review. As long as inspectors are using the example significant deficiency checklist to guide sanitary surveys as described to the reviewers, sanitary surveys for all categories of systems are covering each of the required eight components.

In most instances where significant deficiencies are noted during sanitary surveys, the deficiencies are clearly communicated by MSDH to the affected water system in a timely manner, along with requirements and deadlines for

corrective actions. In its file reviews, the EPA identified one situation where a significant deficiency identified during a sanitary survey was not communicated to the affected water system with expectations for corrective action, and no documentation was found indicating that the deficiency was corrected. This translates to a situation where a water system potentially had uncorrected susceptibility to fecal contamination without being issued a GWR TT violation or being required to issue the associated public notification. From reviewed files, where MSDH did notify systems of significant deficiencies and required corrective actions, some of the corrective actions are well documented as resolved in accordance with applicable schedules; others are not, and in one (1) of these cases no TT or M/R violation appears to have been issued by MSDH.

An itemized summary of the EPA's findings related to sanitary surveys and associated corrective actions for each system reviewed follows in Table D-1.

PWS ID	System Name	Type	Review Summary
MS0010010	Bryandale W/A	CWS	Sanitary survey completed in January 2015 identified 2 significant deficiencies that were well-communicated to system within 30 days, along with requirements for corrective action. Correction of one deficiency and plan for correcting second deficiency documented in correspondence from system that was received by MSDH within 120 days of notice, but corrective action plan was approved via BCA after 120 days – with no corresponding treatment technique violation issued by MSDH. System did not correct second deficiency according to schedule in BCA; for this, MSDH issued treatment technique violation as appropriate.
MS0060020	Town of Winstonville	CWS	Sanitary survey completed in April 2015 identified 1 significant deficiency – lack of documentation associated with inspection of elevated storage tank. No evidence found in files that significant deficiency and corrective action requirements were communicated to the water system, and no documentation found to indicate that significant deficiency was corrected. Failure to meet the 120-day deadline for having an approved corrective action plan in place or to correct the significant deficiency should result in issuance of a TT violation (or "Other" violation for failure to document completion of corrective action) and a requirement for public notification.
MS0100001	Town of Ackerman	CWS	Sanitary surveys completed in April 2013 and May 2016 consider each of the 8 required water system components. No significant deficiencies identified in either survey.
MS0250021	Reedtown Water Association	CWS	Sanitary survey completed in August 2010 identified 1 significant deficiency – inadequate pump capacity. Written notice of deficiency provided to system within 30 days as required and approved corrective action plan in place within 120 days as required. Completion of corrective action by system on approved schedule is well documented in files. Sanitary survey completed in August 2014 considers each of the 8 required water system components, with no significant deficiencies identified.
MS0410023	Natchez Trace Parkway	NTNCWS	Sanitary survey completed in April 2016 identified 1 significant deficiency – improper recordkeeping associated with a cross connection control device. Written notice of deficiency provided to system within 30 days as required. System's correction of the significant deficiency within 120 days well documented in files.
MS0490008	South Winona	CWS	Sanitary survey completed in March 2014 identified 1 significant deficiency – improperly constructed wells. Written notice of deficiency provided to system within 30 days as required. Approved corrective action plan in the form of a signed BCA in place within 120 days. System's correction of significant deficiency in accordance with approved schedule well documented in files.
MS0600007	City of Marks	CWS	Sanitary survey completed in June 2016 considers each of the 8 required water system components. No significant deficiencies identified.
MS0650013	White Oak Water Association	CWS	Sanitary survey completed in May 2015 considers each of the 8 required water system components. No significant deficiencies identified.
MS0740059	Lees Chapel Church	TNCWS	Unable to ascertain if sanitary survey completed in November 2014 considers each of the 8 required water system components, as only those elements with identified deficiencies are included in the sanitary survey report shared with EPA. No significant deficiencies identified.
MS0820003	Casey Jones Water Association	CWS	Sanitary survey completed in August 2014 considers each of the 8 required water system components. No significant deficiencies identified.

Table D-1. System Specific Findings Related to Sanitary Surveys and Associated Corrective Action

In accordance with State law, MSDH collects fees from water systems in exchange for performing drinking water quality analyses required by PWSS Program regulations. For bacteriological monitoring – including source water monitoring conducted under the GWR – water systems in Mississippi acquire sample bottles and accompanying forms from their local health department office. Systems conduct sampling and return filled bottles to the local health department, where a courier service collects them and delivers them to MSDH's Public Health Laboratory in Jackson. (A few systems do choose to use private laboratories instead of the MSDH laboratory.) The laboratory enters analytical results into LabWare, which is MSDH's Laboratory Information Management System (LIMS). From LabWare, results are automatically imported into SDWIS/State. The BPWS receives an electronic alert in the event of total coliform positive or fecal indicator positive monitoring results, and analytical results are mailed to water systems from the State laboratory.

BPWS staff notify water systems by phone/email/FAX of the need to collect triggered source water samples in the event they experience positive total coliform results under the TCR or RTCR. In most cases where systems fail to conduct

triggered source water monitoring within required timeframes, MSDH is identifying the failure and issuing an M/R violation as appropriate. In its review of monitoring data and hardcopy files as part of the Priority Review, reviewers did encounter one circumstance where a system appeared to fail to conduct required triggered source water monitoring and MSDH did not issue an M/R violation. In this situation, water system customers face unacceptable health risk due to their potential exposure to fecal contamination that is present but not discovered, confirmed, or subsequently addressed through corrective action. Furthermore, with no M/R violation issued, the system is not triggered to notify its customers that it failed to complete the required monitoring – also compromising the public health protections offered by the GWR. In one other situation, a system's failure to conduct triggered source water monitoring was denoted with a violation in SDWIS/State, but documentation associated with issuance of the violation was not found in State files.

Water systems and MSDH do not always share a common understanding of whether the system is complying with the GWR via continuous 4-log treatment, or if the system is subject to triggered source water monitoring requirements in the event of positive total coliform monitoring results under the TCR or RTCR. Sanitary survey reports typically include a minimum residual chlorine concentration required to meet a 4-log treatment threshold if this is a feasible compliance option for the water system. However, the sanitary survey reports sometimes do not indicate if the system is on record as complying with GWR by providing continuous 4-log treatment or is subject to triggered source water monitoring requirements of the GWR. In one situation examined as part of the Priority Review, a water system experienced a positive total coliform result under its TCR monitoring. When MSDH notified the system of its responsibility to conduct triggered source water monitoring, the system claimed that it was providing 4-log treatment instead. MSDH had not approved the system's request to provide 4-log treatment for GWR compliance, but nonetheless allowed the system an opportunity to demonstrate that it was providing 4-log treatment at the time of the total coliform positive sample result. When the system was unable to substantiate its claims of providing 4-log treatment and failed to conduct the triggered source water monitoring, MSDH issued a GWR M/R violation as appropriate. However, without definitive documentation of a water system's compliance approach, MSDH's rule implementation decision making is delayed and could potentially compromise the public health protections afforded by the GWR.

In the rare instances where triggered source water monitoring results are fecal indicator positive, MSDH immediately imposes a boil water notice and directs systems to take corrective action rather than allowing five additional samples to be collected from each source as a potential route for avoiding corrective action. When systems fail to comply with MSDH directives for triggered source water monitoring or miss a deadline associated with corrective action, they immediately receive follow-up communication from MSDH reminding them of the need to complete the required action, and later are issued a NOV. From records examined by EPA as part of the Priority Review, only one system was required to complete corrective action in response to a fecal indicator positive triggered source water monitoring result. Although completion of the corrective action itself is well documented in state files, MSDH also required this system to conduct assessment source water monitoring for a period of time after the corrective action was completed. When the assessment source water monitoring was not completed as directed, MSDH did not issue M/R violations as expected.

An itemized summary of EPA's findings related to source water monitoring and associated corrective actions for each system reviewed follows in Table D-2.

PWS ID	System Name	Type	Review Summary
MS0010010	Bryandale W/A	CWS	No triggered source water monitoring result evident after routine TCR TC+ result from sample collected in April 2013. GWR M/R violation issued by MSDH not evident in state files.
MS0060020	Town of Winstonville	CWS	Routine RTCR sample collected in October 2016 determined TC+ on October 28, 2016. Several "special" samples collected on November 3, 2016, but no triggered source water sample collected within 24 hours of routine RTCR TC+ result as required. MSDH issued GWR M/R violation for system's failure to conduct triggered source water monitoring, as appropriate.
MS0250021	Reedtown Water Association	CWS	Routine TCR sample collected in June 2010 was determined TC+. Resulting triggered source water sample from Well #1 was fecal indicator positive. MSDH imposed immediate boil water notice and issued an Agreed Order (AO) July 12, 2010. AO served as approved corrective action plan, and it required system to install 4-log treatment or address source of fecal contamination in well and then complete 12 months of assessment source water monitoring. System completed repairs to Well #1 on August 10, 2010 and notified MSDH of completion with letter dated August 25, 2010. MSDH letter of 9/20/10 confirmed that well repair was satisfactory and requested commencement of 12 months of assessment source water monitoring for Wells #1, #2, and #6. Records found for some assessment source water monitoring samples in some months, but not samples collected in each of the 12 months for each of the 3 sources. No GWR M/R violations issued by MSDH as expected. None of the reported assessment source water monitoring results on file indicate the further presence of fecal contamination in wells.

MS0300197	Presley's Outing #2	TNCWS	No triggered source water monitoring result evident after routine RTCR TC+ result from sample collected in December 2016. MSDH issued GWR M/R violation January 11, 2017, as appropriate.
MS0320015	McNair-Stampley W/A #3	CWS	No triggered source water monitoring results evident after system incurred 2 routine TCR TC+ results from samples collected in August 2015. MSDH issued GWR M/R violation September 11, 2015, as appropriate.
MS0600007	City of Marks	CWS	No triggered source water monitoring results evident after routine TCR TC+ sample collected April 2011. Upon notification of TC+ result, system initially claimed that it was providing 4-log treatment and was not subject to triggered source water monitoring requirements. July 2009, letter from system to MSDH documents system's choice to use continuous 4-log treatment to comply with GWR. However, no additional documentation on file from this time period showing how 4-log treatment would be achieved or MSDH approval of 4-log treatment, and May 2010 sanitary survey indicates that design of system will not allow 4-log treatment threshold to be met. MSDH allowed system to attempt to substantiate its claim of providing 4-log treatment through documentation of residual measurements at time of TC+ result. When system unable to document 4-log treatment, on May 4, 2011 MSDH issued GWR M/R violation for system's failure to conduct triggered source water monitoring. Although corrective action is not required for M/R violations under GWR, on September 23, 2011 system was issued AO subjecting it to triggered source water monitoring until treatment plant rehabilitation was completed. From June 2016 sanitary survey report, it is not clear if system is subject to continuous 4-log treatment or triggered source water monitoring.
MS0650013	White Oak Water Association	CWS	Routine TCR sample collected in July 2012 determined TC+ on July 11, 2012, but triggered source water samples not counted for compliance due to lack of sample date/coding issues. SDWIS shows that GWR M/R violation issued by MSDH, as appropriate, but documentation of violation not evident in state files.
MS0740059	Lees Chapel Church	TNCWS	Routine TCR sample collected in October 2015 determined TC+ on November 2, 2015, but triggered source water sample not counted for compliance due to lack of sample date/coding issues. MSDH issued GWR M/R violation November 16, 2015, as appropriate.
MS0820003	Casey Jones Water Association	TNCWS	Routine TCR sample collected in December 2011 determined TC+ December 14, 2011. Triggered source water sample collected within 24 hours as required, but system did not report analytical results in a timely manner. MSDH issued GWR M/R violation February 6, 2012, as appropriate.

Table D-2. System Specific Findings Related to Source Water Monitoring and Associated Corrective Action

Prior to the GWR compliance deadline in 2009, MSDH sent letters to ground water systems providing them the option of notifying MSDH via a "check the box" form of their intent to comply with the rule via 4-log treatment. Working with systems that chose the 4-log treatment option, MSDH calculated the residual disinfectant level that would provide 4-log treatment and evaluated the adequacy of a sample location for compliance monitoring. (A similar approach has been employed for setting the 4-log treatment compliance framework for systems pursuing 4-log treatment as a corrective action.) At the time of the Priority Review, there were approximately 260 ground water systems in Mississippi that initially chose to perform continuous 4-log treatment and remain on this track for compliance with the GWR. Each of the systems utilizes chlorine disinfection to meet the treatment threshold. With time, infrastructure configurations and operating conditions of water systems may change, and 4-log treatment calculations are revisited and adjusted as necessary as part of the sanitary survey process. Sanitary survey reports prepared by MSDH generally include a minimum disinfectant residual that must be met to achieve 4-log treatment, or a determination that 4-log treatment is not feasible for the design of the water system. In its review of file documents for systems reported as complying with the GWR via 4-log treatment, there was one situation where a record of MSDH's notification to the system of the minimum residual concentration needed to achieve 4-log treatment was not evident. Minimum residual values for achieving 4-log treatment are often included in sanitary survey reports regardless of a system's status as complying with the GWR via the continuous treatment option. In some instances, sanitary survey reports and other file documents for systems reported by MSDH to the EPA as complying with the GWR via 4-log treatment provide a clear indication that the system is following this approach for complying with the rule. In other instances, a system's status as complying with the rule via 4-log treatment is not clear. When water systems are not notified that they are on record as expected to comply with the GWR via 4-log treatment or provided a calculated minimum residual value to demonstrate meeting the treatment threshold, MSDH's ability to determine GWR compliance and issue violations (when appropriate) is compromised.

Once the minimum residual and compliance monitoring location are determined and communicated to the water system, the system must document maintenance of the 4-log threshold through a Monthly Operating Report (MOR) that is kept at the water system. MSDH routinely reviews MORs during annual inspections and sanitary surveys. If MSDH's examination of MORs during inspections and sanitary surveys reveals concerns or if other situations warrant further review, water systems may be required to submit MORs to MSDH each month to verify that treatment goals are being met.

Water systems complying with the GWR via 4-log treatment may discontinue treatment with written determination from the State that 4-log treatment is no longer necessary. From records evaluated by the EPA as part of the Priority Review, two (2) systems appear to have discontinued 4-log treatment at some point since the effective date of the rule. For one of

the systems, MSDH's written determination of the discontinuation was evident in State files; for the other system, the written determination was not found.

Some water systems in Mississippi, in 2009, chose to perform 4-log treatment for compliance with the GWR may not have fully understood the ramifications of that decision. Decisions were made by responsible utility officials not fully aware of the time, effort, and finances necessary to document continuous 4-log treatment. In January 2017, MSDH began allowing systems that initially chose 4-log treatment for compliance with the GWR a one-time "reset" option where they are no longer required to meet the 4-log treatment threshold (but they still must disinfect) and the systems are instead subject to triggered source water monitoring requirements. Systems choosing to discontinue continuous 4-log treatment are also required to conduct assessment source water monitoring of their sources monthly for three months. MSDH is also implementing a new, more conservative method to determine disinfection contact time for its required minimum residual calculations. Those systems remaining on the 4-log treatment compliance track are required to continuously meet a minimum residual concentration value based on the updated calculation.

PWS ID	System Name	Type	Review Summary
MS0100001	Town of Ackerman	CWS	Sanitary survey completed in April 2013 indicates that system is complying with GWR via continuous 4-log treatment, but record of notice to system with minimum residual calculation from this time period or earlier not evident in files. Sanitary survey completed in May 2016 includes a calculation of minimum residual required to achieve 4-log "if the system chooses", but it also indicates that system was no longer complying with GWR via continuous 4-log treatment. No record found documenting MSDH's determination between the 2013 and 2016 sanitary surveys that the system could discontinue continuous 4-log treatment.
MS0490008	South Winona	CWS	Design Capacity Sheets included with sanitary surveys completed in February 2011 and March 2014 include calculations of minimum residual required to achieve 4-log treatment, as appropriate, and both sanitary surveys indicate that records documenting continuous treatment were being maintained by the system. Appropriate documentation of MSDH's determination that the ground water system could discontinue 4-log treatment provided with February 11, 2015, letter from MSDH to the system.
MS0600007	City of Marks	CWS	Letter from the system to MSDH dated July 31, 2009, documents the system's choice to comply with the GWR via 4-log treatment. However, no additional documentation evident from this time period describing how 4-log treatment would be achieved or MSDH approval/notification of the 4-log option. Sanitary survey completed in May 2010, indicates that design of system will not allow 4-log treatment threshold to be met. Calculation of minimum residual required to achieve 4-log treatment included in Design Capacity Sheet with sanitary survey completed in June 2016, but documentation of the system's status as complying with GWR via 4-log treatment or triggered source water monitoring not evident in files.

Table D-3. System Specific Findings Related to 4-log Treatment

Recommendations

EPA offers the following suggestions for consideration by MSDH as it continues implementation of the GWR:

1. Ensure that all GWR violations are loaded into SDWIS, including the 77 TT violations that have been identified among Mississippi water system but are not yet reported to the data system.
2. In all instances where significant deficiencies are identified during annual inspections or sanitary surveys, ensure that the deficiencies are clearly communicated to the affected water system along with corrective action deadlines. Document completion of all required corrective actions within required timeframes or issue violations as appropriate.
3. When water systems are required to conduct assessment source water monitoring, track adherence to the monitoring requirements and any associated corrective actions to their completion. When requirements are not met on schedule, issue violations as appropriate.
4. Adopt and implement a consistent, standardized method for communicating with water systems regarding minimum residual required to demonstrate 4-log treatment and a system's status as complying with the GWR via 4-log treatment or triggered source water monitoring.
5. Ensure that systems receive written notifications from MSDH that they may discontinue 4-log treatment before this level of treatment is stopped and maintain records of the notifications in state files. When 4-log treatment is discontinued before a system receives the written determination from MSDH, issue GWR treatment technique violations as appropriate.

E. Revised Total Coliform Rule

Background

The timing of the Priority Review provided an opportunity for reviewers to evaluate Mississippi's implementation of the RTCR just 12 months after water systems were required to comply with the requirements. This opportunity for an "early look" at implementation, along with the rule's criticality in protecting against acute health risks from entry of harmful pathogens into water distribution systems among all of Mississippi's public water systems, led to selection of the RTCR as a priority for review.

The EPA promulgated the RTCR on February 13, 2013, and minor corrections on February 26, 2014. The rule aims to reduce potential pathways of entry for fecal contamination into water distribution systems and it establishes a MCL for *E. coli*. Systems identified as vulnerable to contamination are required to identify and fix problems, and systems must meet stringent operational criteria in order to qualify for and stay on reduced bacteriological monitoring schedules. Key components of the RTCR include: (1) requirements for monitoring total coliforms and *E. coli* according to a sample siting plan and schedule specific to the public water system; (2) requirements for assessments and corrective action when monitoring results show that systems are contaminated or may be vulnerable to contamination; and (3) requirements for seasonal systems (non-community water systems not operated on a year-round basis that start up and shut down at the beginning and end of each operating season) to certify the completion of state-approved start-up procedures prior to each operating season. The RTCR applies to all PWSs, except aircraft public water systems that are subject to the EPA's Aircraft Drinking Water Rule.

Mississippi Primary Drinking Water Regulations corresponding to the federal RTCR were adopted by the State in January 2016. Water systems were required to comply with the rule beginning April 1, 2016. At that time, although MSDH formally shared implementation responsibility for the RTCR with the EPA under a primacy extension agreement that was effective March 27, 2015, the State was, in effect, implementing the rule independent of the EPA. With MSDH's submission of a complete final primacy revision application to the EPA, the State obtained interim primacy for the rule on June 23, 2016. The EPA's review of the primacy application, completed in June 2017, identified a few minor regulatory adjustments that MSDH will need to make in order for the State to be designated as having final primacy for the RTCR.

Of the approximately 1200 public water systems in Mississippi, the SDWIS/FED database shows a total of only 21 RTCR violations incurred by 15 different water systems since the effective date of the rule. SDWIS indicates that each of the violations is a monitoring violation incurred for the system's failure to collect required routine samples. MSDH has acknowledged that additional violations have occurred but are not yet uploaded to SDWIS/State, and that some of these additional violations are TT violations. MSDH did not provide a list of the additional identified violations to the EPA during the Priority Review.

Like the GWR, implementation of the RTCR at each water system requires active engagement by State personnel. State representatives review sample siting plans to determine if they are appropriately representative of water distribution systems. Among seasonal systems, they track completion of start-up procedures prior to systems serving water to the public at the outset of each operating season. For all systems, they review monitoring results to determine if *E. coli* MCLs are incurred and/or assessments are triggered, and they communicate with water system representatives about follow-up requirements – including the need to perform assessments – when monitoring results indicate risk of fecal contamination. State personnel may assist water systems in performing Level 1 Assessments and they often perform Level 2 assessments when these are required. If sanitary defects are identified through assessments, state representatives track completion of acceptable corrective actions within required timeframes. When seasonal start-up, monitoring, assessment, or corrective action requirements are not met or MCLs are incurred, the EPA expects that violations will be issued. The Priority Review focused on determining whether MSDH is appropriately administering each of the various elements of the rule by examining records impacting compliance since the rule effective date of April 1, 2016.

Scope of Review

In reviewing MSDH's implementation of the RTCR, reviewers gathered responses to questions focusing on procedural issues, including those related to sample siting plans, monitoring and data flow, assessments and required follow-up, seasonal start-up certifications, compliance determinations, and tracking. Monitoring data and hardcopy and electronic files for 11 water systems in Mississippi were also examined to evaluate implementation across three (3) major rule components in the period since the rule became effective. Water systems were selected for evaluation based on their status as having incurred an RTCR violation or having characteristics or a compliance profile of particular consequence to RTCR compliance. The three (3) major rule components include the following:

- **Site Sampling Plans and Monitoring**

Water systems must develop a written site sampling plan that identifies the system's routine and repeat sample sites and sampling schedule, as well as locations of any sampling necessary to meet GWR monitoring requirements. Sample sites must be representative of water quality in the distribution system. States must review and (as appropriate) revise site sampling plans.

Under the federal RTCR, systems must collect routine water samples on a regular basis (monthly, quarterly, annually) and have the samples tested for the presence of total coliforms by a state-certified laboratory. While the federal rule allows a state to reduce the monitoring frequency for some small systems that use only ground water and that meet certain operational performance criteria, Mississippi requires all systems to collect routine samples monthly. The minimum number of routine samples to be collected and analyzed is based on the system type, source, and population served.

Water systems must test each total coliform-positive (TC+) routine sample for the presence of *E. coli*. For each TC+ routine sample, systems must also collect at least three (3) repeat samples. Any TC+ repeat sample must also be analyzed for the presence of *E. coli*. If one or more of the repeat sample set is TC+, the water system must collect another set of at least three repeat samples – unless an assessment has been triggered and the system has notified the State.

Water systems incur an *E. coli* MCL violation when there is any combination of an *E. coli*-positive (EC+) sample result with a routine/repeat TC+ or EC+ sample result, as presented in Table E-1.

Routine	Repeat
EC+	TC+
EC+	Any missing sample
EC+	EC+
TC+	EC+
TC+	TC+ (but no <i>E. coli</i> analysis)

Table E-1. Sample Result Combinations Resulting in an *E. coli* MCL

Results of routine and repeat monitoring conducted by water systems may also trigger requirements for Level 1 and Level 2 assessments to be conducted, as presented in Table E-2.

Level 1 Assessment Triggers	Level 2 Assessment Triggers
Water system collecting < 40 samples/month has ≥ 2 TC+ routine/repeat samples in same month	Water system incurs an <i>E. coli</i> MCL violation.
Water system collecting ≥ 40 samples/month has > 5.0% routine/repeat TC+ samples	Water system has a second Level 1 Assessment within a rolling 12-month period.
Water system fails to take every required repeat sample after any single TC+ result	Water system on state-approved annual monitoring has a Level 1 Assessment trigger in 2 consecutive years. N/A in Mississippi.

Table E-2. Level 1 and Level 2 Assessment Triggers

For the Priority Review, reviewers examined site sampling plans prepared by five (5) water systems. Documentation associated with six (6) additional water systems was checked to determine if these systems are on record as scheduled to collect at least the required minimum number of routine RTCR samples. Compliance determinations made by MSDH in association with monitoring data received for each of the 11 water systems were also evaluated.

- Assessments and Corrective Action

As presented in Table E-2, above, the RTCR requires water systems that have an indication of coliform contamination to assess the problem and take corrective action. The purpose of assessments is to find sanitary defects at the water system, including those that could provide a pathway of entry for microbial contamination, or that indicate failure (existing or potential) of protective barriers against microbial contamination. There are two (2) levels of assessments based on the severity or frequency of the problem.

- Level 1 Assessment – is a basic evaluation of the water system most often performed by the water system owner or operator (with optional assistance from the State). A completed assessment form must be submitted within 30 days of the system learning of the assessment trigger.
- Level 2 Assessment – a more detailed, comprehensive review of the water system that considers additional internal and external resources that is conducted by an individual approved by the State. The water system is responsible for ensuring that the Level 2 Assessment is conducted and that a completed assessment is submitted to the State within 30 days of the system learning of the assessment trigger.

When sanitary defects are identified during a Level 1 or Level 2 Assessment, the water system must complete corrective action by the time the assessment form is submitted to the State, or within a state-approved timeframe that is proposed in the assessment form. Systems failing to complete required assessments or corrective actions on schedule should be assigned TT violations under the RTCR. When water systems complete a required assessment but fail to submit the completed form or fail to notify the State when they complete a corrective action, they should be issued reporting violations.

As part of the Priority Review, assessment forms and other documentation associated with situations where systems were required to conduct assessments were evaluated for three (3) water systems. For each of the systems, examined data suggest that corrective action was also required, and MSDH's implementation of these requirements was considered in the evaluations.

- Seasonal System Start-Up Procedures

The RTCR defines a seasonal system as a non-community water system that is not operated as a PWS on a year-round basis and starts up and shuts down at the beginning and end of each operating season. Before serving water to the public at the beginning of each operating season, seasonal systems must conduct and certify completion of state-approved, start-up procedures. States may exempt a seasonal system from conducting some or all state-approved start-

up procedures if the system maintains pressure throughout its distribution system during periods when it does not operate as a PWS.

Only two (2) water systems in Mississippi are classified by MSDH as seasonal systems. At the time of the Priority Review, only one (1) of the two (2) systems had started seasonal operations during a period when the RTCR was in effect. Documentation associated with this system's seasonal start-up certification was evaluated as part of the review.

Key Observations

In Mississippi, all PWSs were expected to submit their RTCR site sampling plan to MSDH by mid-December 2015. Through a "check the box" response on a form provided by MSDH, systems chose one (1) of three (3) options for their siting approach: (1) Standard Site Selection where repeats are collected at the original site and within five (5) service connections upstream/downstream; (2) Specific Repeat Location Sites where the system identifies specifically-chosen repeat sites that correspond to the original sample site where a TC+ routine result is encountered; or (3) a Sample Determination Protocol where the system develops a protocol for determining repeat locations on a case-by-case basis for TC+ routine monitoring results. In completing the form, systems also provided a brief narrative description of identified monitoring locations. Additionally, systems were expected to provide a map showing the locations of RTCR monitoring sites and source wells. The form is clear in indicating that monitoring is required on a monthly schedule. In reviewing the site sampling plans, MSDH central office staff coordinated with regional engineers to communicate with water systems if questions arose or revisions to the siting plan were necessary. On an ongoing basis, regional engineers review site sampling plans during sanitary surveys. Systems are notified in writing when a population change requires a different number of routine monthly samples.

In most cases, water system site sampling plans reflect an appropriate number of samples collected at locations that appear representative of distribution system water quality. In its review of file documentation, the EPA did identify two (2) small non-community water systems where sample siting plans show that MSDH is allowing the one required routine monthly RTCR sample to be collected at a site that may be more representative of source water quality than of distribution system water quality.

MSDH performs water quality analyses required of PWSs by the RTCR under its monitoring fee program. As with the GWR, systems acquire sample bottles and accompanying forms from their local health department office or directly from MSDH's Public Health Laboratory in Jackson. Systems conduct sampling and return filled bottles and chain of custody forms either to the local health department or to the Public Health Laboratory. A courier service collects samples returned to local health department offices and delivers these samples to the Public Health Laboratory for analysis. A few systems do choose to use private laboratories instead of the MSDH laboratory. The laboratory enters analytical results into LabWare. From LabWare, results are automatically imported into SDWIS/State. The BPWS receives an electronic alert in the event of TC+ or EC+ monitoring results, and analytical results are mailed to water systems from the Public Health Laboratory.

MSDH is issuing clear and timely monitoring violations to systems that fail to conduct routine monthly RTCR monitoring. When routine RTCR samples are TC+, BPWS central office staff notify water systems by phone/email/FAX of the need to collect repeat samples. Based on results received (or not received) from the laboratory, MSDH staff manually determine compliance with the *E. coli* MCL and if an assessment is triggered. Systems that incur routine TC+ (and sometimes EC+) results are generally collecting the correct number of repeat samples from standard repeat monitoring locations within required timeframes; however, situations were identified where systems failed to take repeat samples within required timeframes (and an approved extension is not on file) and MSDH did not notify the system that it had triggered an assessment or issue an *E. coli* MCL as expected. Without determining the need to conduct an assessment, MSDH is left without a trigger to know to issue a TT violation when the assessment is not completed in the required timeframe. When routine and repeat monitoring is conducted on schedule, MSDH is effective in determining if an assessment has been triggered and communicating the correct assessment level requirement (Level 1 or Level 2) to the system.

An itemized summary of EPA's findings related to sample siting plans and monitoring for each system reviewed follows in Table E-3.

PWS ID	System Name	Type	Review Summary
MS0180008	City of Hattiesburg	CWS	Sample siting plan not evaluated by EPA, but system did collect 50 routine samples per month all months since April 2016 as required. System experienced 2 TC+ routine sample results in September 2016 and one TC+ routine result in October 2016, February 2017, and March 2017. Each of the TC+ routine samples was EC-, and all required repeat samples were TC-. In each case, MSDH determined that no MCL violation had occurred and that no assessment was triggered, as appropriate.
MS0310009	Paulding Water Association	CWS	Sample siting plan not evaluated by EPA, but system did collect 2 routine samples per month all months since April 2016 as required. Routine samples collected June 8, 2016 included one TC+ result, which was posted and faxed to system June 10, 2016. (Sample was EC-) Required number of repeat samples not collected until June 13, 2016, without documentation found in file of an extension to the 24-hour time limit for collecting repeat samples. MSDH did not notify system of the need to conduct a Level 1 Assessment for its failure to collect repeat samples in a timely manner. No assessment was conducted, and no RTCR treatment technique violation was issued by MSDH as expected.
MS0420010	East Leflore Water and Sewer District	CWS	Sample siting plan not evaluated by EPA, but system did collect at least 6 routine samples per month all months since April 2016 as required. System experienced 2 TC+ routine sample results in July 2016 and one TC+ routine result in September 2016. Each of the TC+ routine samples was EC-. In both July and September 2016, repeat samples were collected within 24 hours of the routine results. All 6 required repeat samples in July were TC-, but as appropriate, MSDH identified a Level 1 Assessment trigger based on routine monitoring results. One of 3 required repeats in September was TC+, which led MSDH to identify a Level 2 Assessment for a second assessment trigger within 12 months (without the State having established the reason for the July 2016 TC+ results and correction of the problem), as appropriate. Communication of triggers and assessment requirements to system well documented in files.
MS0430002	City of Brookhaven	CWS	Sample siting plan not evaluated by EPA, but system did collect 10 routine samples per month all months since April 2016 as required. System experienced 2 TC+/EC+ results from routine samples collected January 10, 2017 (with results posted January 12, 2017). At the direction of MSDH, several special "boil water" samples were collected January 12, 2017 and January 13, 2017 (some of which were TC+ and one of which was EC+) before repeat samples were collected January 15, 2017. No documentation found in file of an extension to the 24-hour time limit for collecting repeat samples. Failure to collect repeats within 24 hours of TC+/EC+ routine results should have resulted in an <i>E. coli</i> MCL violation, but no violation was issued. MSDH did impose a boil water alert and required the system to conduct a Level 2 Assessment, which was appropriate for the <i>E. coli</i> MCL violation.
MS0430012	Steves Plaza	TNCWS	Sample siting plan acceptable and includes 5 potential sites for one required routine monthly sample, with repeat sites at standard locations within 5 service connections upstream/downstream and at location of TC+ result. System conducted its routine monthly monitoring on schedule April 2016 through October 2016, but failed to conduct monitoring in November 2016. MSDH issued an RTCR monitoring violation December 16, 2016, as appropriate. System resumed its routine monitoring, as appropriate, in December 2016.
MS0470084	Galena School	NTNCWS	Sample siting plan includes 19 potential sites for one required routine monthly sample. Generally, only 2 of the 19 sites are utilized for routine monitoring, and one of the 2 sites is at the well house and may not be among sites most representative of distribution system water quality. System conducted its routine monthly monitoring in April 2016, but failed to conduct monitoring in May 2016. MSDH issued an RTCR monitoring violation June 7, 2016, as appropriate. System resumed its routine monitoring, as appropriate, in June 2016.
MS0550058	Pearl River Central Water Association	CWS	Sample siting plan not evaluated by EPA, but system did collect at least 4 routine samples per month all months since April 2016 as required. System experienced 2 TC+ routine sample results in June 2016. Repeat samples were collected within 24 hours of the routine results. All 6 required repeat samples were TC-, but as appropriate, MSDH identified a Level 1 Assessment trigger based on routine monitoring results. Communication of trigger and assessment requirements to system well documented in files.
MS0680008	Paynes Water Association	CWS	Sample siting plan acceptable and includes 10 potential sites for one required routine monthly sample, with repeat sites at standard locations within 5 service connections upstream/downstream and at location of TC+ result. System conducted its routine monthly monitoring on schedule April 2016 through November 2016. Routine sample collected December 15, 2016 was rejected for analysis by lab for holding time exceedance because lab was closed for weekend when sample received (December 15, 2016). System failed to collect/analyze replacement sample during December. MSDH issued an RTCR monitoring violation January 5, 2017, as appropriate. System resumed its routine monitoring, as appropriate, in January 2017.
MS0690021	Independence Methodist Church	TNCWS	Sample siting plan describes one sample location only by the street address of the water system, and a photo map of the sampling location appears to be a well site that may not be most representative of distribution system water quality. System failed to conduct routine monthly monitoring in April 2016 and May 2016, and MSDH issued RTCR monitoring violations as appropriate. System experienced a TC+ routine monitoring result from its routine monthly sample collected September 28, 2016. (Sample was EC-) Routine TC+ sample result was posted 9/30/16 – a Friday. Repeat samples not collected until October 13, 2016 – Monday – without documentation found in file of extension to 24-hour deadline for collecting repeat samples or communication of Level 1 Assessment trigger to the water system. As a small rural church, system may not have been aware of TC+ results until October 2, 2016 or October 3, 2016, in which case repeat samples were collected within 24 hours of notification and no Level 1 Assessment was triggered. All 3 repeat samples were TC-.
MS0700011	Town of Walnut	CWS	Sample siting plan acceptable and includes 10 potential sites for 2 required monthly routine samples with repeat sites at standard locations within 5 service connections upstream/downstream and at location of TC+ result. System conducted its routine monitoring on schedule in April 2016 and May 2016, but failed to conduct monitoring in June 2016. MSDH issued an RTCR monitoring violation July 11, 2016, as appropriate. System resumed its routine monitoring, as appropriate, in July 2016.

MS0810032	Water Valley Landing	TNCWS	Sample siting plan not evaluated by EPA, but seasonal system did collect 1 routine sample per month during months operating as a public water system since April 2016 as required. System did not experience any TC+ routine monitoring results. Each month, MSDH determined that no <i>E. coli</i> MCL violation had occurred and that no assessment was triggered, as appropriate.
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Table E-3. System Specific Findings Related to Sample Siting Plans and Monitoring

When MSDH determines that a water system has triggered an assessment, BPWS central office staff notify the affected system by phone. The Level 1 Assessment form is emailed or Faxed to the system along with instructions for conducting the assessment. MSDH regional engineers are notified of the assessment requirement at the same time as the water system. Level 1 Assessments may be performed by the system alone, or with assistance from MSDH via telephone or in person. During 2016, MSDH identified 31 Level 1 Assessment triggers among its regulated PWSs. Inadequate disinfectant residual in the distribution system was the most common sanitary defect identified through Level 1 Assessments. When triggered, the Level 2 Assessment form is mailed to the appropriate MSDH regional engineer to be completed. Three (3) Level 2 Assessment triggers have been identified by MSDH since the effective date of the RTRC. File documentation examined as part of the Priority Review indicates that both Level 1 and Level 2 assessments are considering required minimum assessment elements. However, the EPA did encounter one situation where the individual performing a Level 2 Assessment at a water system was not approved to do so (as outlined in the State's RTRC primacy application), and no TT violation was issued as expected. A non-approved individual conducting a Level 2 Assessment without a violation being issued compromises the public health protections offered by the RTRC.

Among water system files examined as part of the Priority Review, all sanitary defects identified during Level 1 Assessments were reported as corrected on assessment forms submitted by water systems to MSDH. The EPA encountered one situation where a Level 2 Assessment form included uncorrected sanitary defects. In this instance, a timetable for correcting the defects was not evident, the defects were not documented as corrected, and no TT or reporting violation was on file as expected.

An itemized summary of the EPA's findings related to assessments and associated corrective actions for each system reviewed follows in Table E-4.

PWS ID	System Name	Type	Review Summary
MS0420010	East Leflore Water and Sewer District	CWS	System triggered a Level 1 Assessment in July 2016 based on TC+ routine monitoring results. MSDH communication of requirement for conducting Level 1 Assessment to system well documented in files. Assessment completed within 30 days as required, and identified sanitary defects documented in the assessment report from the water system as corrected. System triggered Level 2 Assessment in September 2016 based on routine/repeat monitoring results and second trigger within 12 months. Level 2 Assessment was completed 30 days from notification by MSDH by the same individual that completed the Level 1 Assessment in July (system operator) rather than a state or contract employee as specified on the assessment form and in MSDH's RTRC primacy application. No RTRC treatment technique violation issued by MSDH as expected.
MS0430002	City of Brookhaven	CWS	System failure to collect repeat samples within 24 hours of TC+/EC+ routine results in January 2017 should have resulted in <i>E. coli</i> MCL violation, but MSDH did not issue the violation. MSDH did require system to conduct Level 2 Assessment, as appropriate for the <i>E. coli</i> MCL situation. Assessment was completed within 30 days of trigger by state-approved personnel and the assessment identified several sanitary defects; however, a timetable for resolution of each defect was not included with the assessment, and resolution of each defect is not documented in files shared with EPA. No RTRC treatment technique or reporting violations issued by MSDH as expected.
MS0550058	Pearl River Central Water Association	CWS	System triggered a Level 1 Assessment in June 2016 based on TC+ routine monitoring results. MSDH communication of requirement for conducting Level 1 Assessment to system well documented in files. Assessment completed within 30 days as required, and identified sanitary defects documented in the assessment report from the water system as corrected. System identification information on the assessment form is incomplete.

Table E-4. System Specific Findings Related to Assessments and Corrective Actions

MSDH has prepared a form with detailed instructions for seasonal water systems to use in certifying completion of their required start-up procedures. The form and instructions specify that systems must be visually inspected, checked for integrity with pressure measurements taken one (1) hour apart, flushed, and disinfected. Prior to opening, systems must also collect two (2) sets of distribution samples, from locations identified in the sample site plan, at least 24

hours apart – and all results must be non-detect for total coliform. From the one seasonal system file examined as part of the Priority Review, seasonal system start-up procedures in Mississippi are being implemented in accordance with regulatory requirements and state policy.

A summary of the EPA’s findings related to seasonal system start-up procedures for the one (1) system reviewed follows in Table E-5.

PWS ID	System Name	Type	Review Summary
MS0810032	Water Valley Landing	TNCWS	File documentation indicates that system maintains pressure during periods it does not operate as a public water system, but MSDH does not exempt the system from any start-up procedure requirements. With form dated March 9, 2017, system appropriately and completely certified completion of start-up procedure prior to commencing seasonal operation in April 2017. Start-up procedure certification includes 2 non-detect bacteriological sample results.

Table E-5. System Specific Findings Related to Seasonal System Start-Up Procedures

Recommendations

The EPA provides the following recommendations to MSDH as it continues implementation of the RTCR:

- Ensure that all RTCR violations are loaded into SDWIS/State as they are identified, including *E. coli* MCL violations, TT violations, and reporting violations.
- Ensure that site sampling plans reflect that all routine RTCR monitoring occurs within the distribution system rather than at source wells.
- Notify systems that they have triggered an assessment when required repeat samples are not collected within 24 hours of a routine RTCR TC+ sampling result and issue an *E. coli* MCL when the routine sample is also EC+.
- When extensions to the 24-hour deadline for collecting repeat samples are authorized, provide documentation of such decisions in State records.
- Ensure that all Level 2 Assessments are conducted by State-approved personnel, as outlined in MSDH’s RTCR primacy application.
- Use email or some other form of written communication to document MSDH’s approval of assessments and corrective action timetables associated with sanitary defects identified through assessments and expect confirmation from systems when each identified defect has been resolved. When defects are not documented as resolved in accordance with the approved timetable, issue RTCR treatment technique or reporting violations as appropriate.

F. Long Term 2 Surface Water Treatment Rule

LT2ESWTR was recognized early as a potential candidate for this review partly due to attention centered on the City of Jackson water system's LCR ALE, along with the commensurate concern regarding the potential for simultaneous compliance issues at the system. Reviewers chose to focus on the UV disinfection treatment component of the LT2ESWTR, because of complexities with implementation and compliance. This was also an opportunity for the EPA to provide expertise to MSDH, which could help inform decisions related to upgrades to the water system's infrastructure at both treatment plants.

Background

The City of Jackson system serves a population of about 193,000 and has two (2) surface-water treatment plants. The Jackson system also has a well field (Maddox Road) and associated distribution system (which are outside the scope of this review). The source of water for the O.B. Curtis water treatment plant is the Pearl River impoundment known as the Ross Barnett Reservoir, while the J.H. Fewell plant draws directly from the Pearl River. The Curtis plant has two (2) separate treatment processes: a 25 MGD conventional treatment train, and a 25 MGD micro/ultra-filtration (General Electric ZeeWeed™ hollow-fiber membrane) train. The Fewell plant is a 25 MGD conventional treatment plant. Both plants use Trojan UVSwift™ 4L24 UV disinfection reactors. Chloramines are used for disinfection at both plants.

The EPA published the LT2ESWTR in the Federal Register on January 5, 2006. The LT2ESWTR was intended to supplement existing regulations by targeting additional Cryptosporidium treatment requirements to higher risk systems. Prior to LT2, federal regulations had required filtered water systems to reduce source water Cryptosporidium levels by 2-log (99 percent).

Regulation of the protozoan parasite, Cryptosporidium, first appeared in the Interim Enhanced Surface Water Treatment Rule (IESWTR). Cryptosporidium, unlike pathogens such as bacteria and most viruses, is highly resistant to standard disinfectants like chlorine and chloramines. Consequently, control of Cryptosporidium in most treatment plants is dependent on physical removal processes. The IESWTR established a Maximum Contaminant Level Goal of zero for Cryptosporidium; required 2-log (99 percent) removal; set a combined filter effluent turbidity performance standard of 1.0 Nephelometric Turbidity Unit (NTU) as a maximum, and 0.3 NTU or less at the 95th percentile monthly for treatment plants using conventional or direct filtration treatment; and required individual filter monitoring.

Under the LT2ESWTR, systems were to monitor their water sources to determine treatment requirements. This monitoring included an initial two (2) years of monthly sampling for Cryptosporidium. Monitoring starting dates were staggered by system size, with smaller systems beginning monitoring after larger systems. Based on the results of this monitoring, filtered water systems were to be classified in one (1) of four (4) treatment categories (bins). If a system's bin classification required additional Cryptosporidium treatment, the system could select from a wide range of treatment and management strategies included in the LT2ESWTR's "microbial toolbox" to meet those requirements. Systems were to conduct a second round of monitoring six (6) years after completing the initial round to determine if source water conditions had changed significantly.

The LT2ESWTR (at §141.701(d)) allowed systems to avoid conducting source water monitoring if the system provided, or was to provide, a total of at least 5.5-log of treatment for Cryptosporidium (equivalent to a Bin 4 classification). The City of Jackson gave notice of their intention to provide such treatment in a letter dated April 14, 2006. Consequently, source-water monitoring for Cryptosporidium was never conducted, and it is not currently known whether additional treatment would have been required (and if it was required, what level). However, since the City of Jackson chose to avoid monitoring, the system must comply with all applicable provisions of the surface-water regulations, including **maximum** Cryptosporidium treatment under LT2ESWTR.

Scope of Review

The EPA initially requested some basic information from the State regarding current treatment for *Cryptosporidium* at the Jackson system, followed by a conference call between the parties on March 24, 2017. The purpose of this call was to confirm Jackson's current use of UV disinfection at both treatment plants. Following that call, the EPA provided the State with the EPA's guidance document specific to UV treatment (i.e. *Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule*, November 2006).

During the onsite portion of the review, the EPA originally planned to obtain copies of UV-specific reporting by the Jackson system. The EPA Region 4 intended to review this information and evaluate the adequacy of the system's reporting under the LT2ESWTR. However, an onsite interview with the regional engineer in charge of the Jackson area confirmed that the Jackson system has not been providing UV reporting to the State at all. A report of the State's most recent inspection/sanitary survey for the Jackson system was obtained during the onsite. On May 2, 2017, the regional engineer provided the following documents regarding the City of Jackson's UV equipment: *Trojan UVSwift™ 24 UV Disinfection Reactors Third Party Validation*, March 15, 2004; *UV8000 Bioassay at Jackson, MS*, May 26, 2000; and the UV equipment portion of an unnamed specifications document prepared for a proposed expansion of the Curtis plant.

Key Findings

The LT2ESWTR allows a 3-log *Cryptosporidium* removal credit for conventional treatment plants in full compliance with the IESWTR. Speculatively, the *Cryptosporidium* removal credit for the Fewell plant, (and perhaps the conventional treatment train of the Curtis plant), is likely 3-log. If correct, these treatment facilities would then be required to provide an additional 2.5-log of treatment under LT2ESWTR (§141.711(a)). The annual inspection report/sanitary survey provided by MSDH includes the UV dose at the Fewell plant (i.e. 28.9 mJ/cm²). However, that report does not include the UV dose for either the conventional or membrane treatment trains at the Curtis plant, nor is the *Cryptosporidium* removal credit for membrane treatment specified.

At the time of the annual inspection, all membranes at Curtis were failing integrity testing, and the State was not giving log-removal credit for membrane treatment. Although this issue may have since been resolved, the report does not indicate whether all of the water going through Curtis was otherwise being treated when the membranes were failing, or whether treatment continued through a broken membrane treatment system. Compliance determination would depend on which of these alternatives actually occurred. Reviewers probably could have evaluated compliance better by reviewing the system's monthly operating reports, but those reports were not requested by the EPA until August and were not provided by MSDH.

UV disinfection monitoring requirements are found at §141.720(d)(3)(i). Accordingly, the Jackson system should be monitoring each UV reactor for (at least) flow rate, lamp status, and UV intensity as measured by a UV sensor. The regional engineer confirmed that UV monitoring is not a part of either plant's supervisory control and data acquisition (SCADA) system. MSDH should determine whether this minimum monitoring is, or can be, accomplished with existing equipment, and whether the equipment may be linked to SCADA.

UV disinfection reporting requirements at §141.721(f)(15) require water systems to report the following items:

- Initial reporting – Validation test results demonstrating operating conditions that achieve the UV dose for compliance with the LT2ESWTR, and
- Routine reporting – Percentage of water entering the distribution system that was not treated by the UV reactors operating within validated conditions on a monthly basis.

Reviewers recognize that MSDH is likely to have evaluated the required UV operating conditions sometime in the past as evidenced by the provided *Trojan UVSwift™ 24 UV Disinfection Reactors Third Party Validation* document. However, since routine monthly reporting is contingent on those specific operating conditions, MSDH will need to revisit UV validation at the Jackson system.

Regulations at §141.720(d)(3)(ii) specify that a system must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose in order to receive UV disinfection credit. Clearly, this determination cannot be made until the system provides routine monthly reports. Therefore, at the very minimum, the system should have received a M/R violation each month for failure to report the amount of “off-specification” water delivered to the public.

The EPA’s *Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule* is a wealth of information regarding UV and can be used as a reference.

One of the principal reasons for including the UV portion of the LT2ESWTR in this Priority Review was to offer MSDH assistance in regulating this technology. EPA’s national UV treatment expert, Mr. Michael Finn, was contacted by Region 4 and Mr. Finn has volunteered to provide personal assistance to MSDH by walking through the entire implementation and compliance process. The EPA encourages MSDH to take advantage of this opportunity as soon as possible.

G. PWSS Enforcement

Background

Compliance and Enforcement Program Implementation was selected as a priority area for review in order to assess whether the State is implementing the requirements of the PWSS Program. States ensure that human health is safeguarded by enforcing the requirements of the SDWA and thereby protecting the states' public drinking water supply and its sources. Through the review, the EPA promotes regional consistency, identifies successes in implementation of the PWSS program and identifies opportunities for improvement in the compliance and enforcement programs.

In January of 2010, the EPA began implementation of a new enforcement approach designed to help our nation's PWSs comply with the requirements of the SDWA. This new approach replaced the previous system of contaminant-by-contaminant compliance strategy with one that focuses attention on the drinking water systems with the most serious or repeated violations. This strategy identifies public water systems with violations that rise to the level of significant noncompliance by focusing on those systems with health-based violations and those that show a history of violations across multiple rules. The system-based methodology is intended to ensure the consistency and the integrity of the PWSS national enforcement program. This approach includes a revised Drinking Water Enforcement Response Policy (ERP) and the ETT.

The ETT is a tool that enables the prioritization of the PWSs by assigning each violation a "weight" or number of points based on the assigned threat to public health. Points for each violation at the water system are summed to provide a total score for that water system. Water systems whose scores exceed a certain threshold are considered a priority system for enforcement (i.e. any score of 11 or above).

The EPA recognizes that states carry out both formal and informal enforcement and compliance assistance activities. These activities can be effective tools for achieving compliance. Nevertheless, systems specifically identified by the ETT as priorities must be returned to compliance or the EPA will expect formal, enforceable mechanisms to compel compliance. States are expected to escalate their response, as necessary, to ensure that compliance is accomplished. Once a public water system is identified as an enforcement priority on the ETT list, an appropriate formal action or return to compliance will be expected within two (2) calendar quarters to be considered "timely". However, regardless of a public water system's position on a state's ETT list, the EPA expects that states will act immediately on acute, health-based violations and subsequently confirm that systems with such violations are returned to compliance.

Scope of Review

Reviewers utilized a combination of data analysis, personnel interviews, comparison of established program strategies/practices with the ERP, and onsite file reviews to evaluate MSDH's successes in implementation of the PWSS program and identify opportunities for improvement in its compliance and enforcement program. Data analysis included a review of the EPA ETT Tracker, which is a tool that provides useful metrics for water systems current and past ETT scores for up to 20 quarters. This information was used to aid in the selection of the files to be reviewed and to get a cursory evaluation of MSDH's ability to timely and appropriately return systems to compliance or issue formal, enforceable mechanisms that will compel a water system to RTC. Additionally, SDWIS/Fed was used to determine what violations and enforcement had been done for each of the selected systems. 20 systems were selected by the EPA for the enforcement component of the review (See *Enforcement Component Priority Review Analysis Workbook* for a list of the files selected). Interview questions were used to understand the dynamics of the organization including staffing resources and demands and to determine how the established enforcement strategies/practices were being implemented with regards to MSDH's compliance and enforcement program. MSDH did not have any written strategies in place at the time of the Priority Review, therefore, the enforcement practices and process information were solely gathered through interviews, email correspondence, the *Bureau of Public Water Supply: Compliance & Enforcement Guidelines* document (included in the *Enforcement Component Priority Review Analysis Workbook*) and evaluation of file information. This information was then compared with the ERP for consistency to ensure that the activities MSDH was conducting enabled the State to meet the expectations of timely and appropriate compliance and enforcement. *Mississippi State Department of Health: Public Water Systems Capacity Development Reports (Fiscal Year 2015 and 2016)* were reviewed for further understanding of the PWSS program as well an evaluation of the areas of success and any areas being focused on for future improvements to the PWSS program. File reviews included a review of the violations determined, an evaluation of

the enforcement mechanisms issued for consistency with the ERP, and a comparison of the information found during the file review with the data reported to SDWIS/State and then uploaded to SDWIS/Fed. The timeframe established for the enforcement component of the review was from October 1, 2011 through September 30, 2016. There were two (2) exceptions to this timeframe: (1) all radiochemical (RAD) violations were not included as part of the review due to extenuating circumstances that were unique to MSDH and well known and understood by the EPA, (2) in a few instances enforcement records that were outside the timeframe of review were reviewed since they concerned violations that occurred during the timeframe. This was done to help the EPA better understand how the violations were and are currently being handled.

Note: Due to the extensive use of data in this portion of the report, and due to the data being far more useful in electronic rather than print format, the EPA will provide MSDH with all referenced compliance and enforcement tables in electronic format. Therefore, where such references are found within the following text, the reader is directed to specific Worksheets included within the companion Microsoft Excel Workbook named "Enforcement Component Priority Review Analysis Workbook.xlsx"

Key Observations

It is important to note that this report only represents a snapshot in time during the period of review. The EPA recognizes that the State may have implemented changes to their data system and policies since the review was conducted.

Compliance and Enforcement Strategy and Procedures

One of the purposes of the enforcement component of the Priority Review was to evaluate whether MSDH had any consistent enforcement strategies or practices and if these practices were being followed consistently for all systems. During interviews conducted prior to the review and during the review, it was determined that MSDH does not have any written EMS or SOPs for the compliance and enforcement program. The following is a description of the way activities are handled based on interviews and email correspondence (See the *Bureau of Public Water Supply: Compliance & Enforcement Guidelines* document in the *Enforcement Component Priority Review Analysis Workbook*). Enforcement is handled on a case-by-case basis for each rule. Rule Managers and Regional Engineers communicate with systems who are out of compliance, or moving in that direction, via email, one-on-one meetings, and telephone calls. The enforcement mechanisms observed were NOV (including request for PN); Administrative Orders (AOs) which generally did not seek penalty, required submission of a compliance plan to correct violations, and did not have a final compliance deadline; and Administrative Hearings, which were newly instituted by MSDH in early 2017. In this case, agreements are reached under the supervision of the Hearing Officer, who then issues a formal action signed by all parties that defines interim milestones as well as final compliance dates required to RTC.

During the review of the file records and after conversations with the staff, it was difficult to determine consistent application of the enforcement mechanisms and why one system with multiple violations received an enforcement action or escalation, while another system with similar circumstances did not. Considering there were no written policies, it was difficult to ascertain if the current activities enable MSDH to be consistent with the ERP.

MSDH is consistently sending out NOV with a request for Public Notice. The majority of the violations received a NOV with PN request, specifically 212 of the 220 violations reviewed received a NOV with PN request. The NOV part of the document, identifies the type of violation and requires the system to provide PN. However, the NOV portion of the document doesn't define when the violation occurred or any corrective actions (other than doing the PN) that are required to RTC. The PN portion is more descriptive in most instances, however, there were several occasions where the PN didn't identify the timeframe of violation and was being used for multiple violations as identified by the linking in SDWIS/State and SDWIS/FED.

The AOs reviewed were vague about the exact violations that prompted the issuance of the order. The type of violation was defined, but there were no timeframes provided of when the actual violation(s) occurred. The documents required the submission of a compliance plan by a defined timeline that would address the actions to be completed in order to RTC. However, these documents did not have any defined final compliance deadlines that were enforceable if not met. This was

especially concerning in situations where the order was several years old and continuing to be linked to the same violation type, but there was no RTC. This is indicative of a failure to generate a RTC enforcement action. The most extreme instance of this was with the water system, Moore Bayou (PWS ID: MS0140012). The Order was issued on August 15, 2013, but the water system remained in noncompliance through 2016, without any change or escalation of the enforcement (during the review period). The EPA recognizes that MSDH has made some changes to their process to remedy situations with the older Orders, by using the Hearing Process and then issuing Orders that include specific timelines and final compliance dates. Moore Bayou is one (1) system which MSDH entered into the Hearing process. Although this happened outside of the period of review, the Order was reviewed and found to have clear expectations, interim milestones, and a final compliance date. An Order written this way can result in a water systems' RTC in a reasonable timeframe.

Ten (10) of the 20 systems reviewed were priority systems during the period of review (Note: For the ETT evaluation, the period of review excluded the information from April 2012 ETT-October 2013 ETT due to the aforementioned RADs situation that would skew any further evaluation if included). See "Jan 2017 ETT Scores Tracker" in *Enforcement Component Priority Review Analysis Workbook* for the table depicting the quarterly ETT scores from the January 2017 ETT Scores Tracker reflecting data reported to SDWIS/FED through September 30, 2016, discussed further below.

Of the ten (10) priority water systems, four (4) had ETT scores of 11 or more for three consecutive quarters or more of the review period (excluding April 2012-Oct 2013 ETT Lists). All four (4) of these water systems had no orders issued during the period of review (South Central, North Hinds W/A #2-Chapel Hill, Darlove-Murphy Water Assn, and Black Bayou Water). All four (4) water systems were in priority status for three (3) or more quarters, which is indicative of a failure to escalate enforcement in a "timely" manner as outlined in EPA's ERP. It should be noted that all four (4) of these water systems were targeted for the Hearing Process approach in early 2017 and have since been issued formal agreements to address the violations, however, this was outside of the period of review. In order to address these water systems within six (6) months of becoming a priority water system, formal enforcement would need to be initiated much earlier.

The EPA does however, commend MSDH for pursuing the Hearing Process to improve the State's methods of obtaining RTC once formal enforcement is necessary. Many of the water systems reviewed were targeted for the Hearing Process (see those with an asterisk above) and are now under much more effective and enforceable agreements.

SDWIS Violation and Enforcement Action Data Quality Review (including associated PNs)

The second purpose of the EPA enforcement component of the review was to verify whether information in MSDH's files (SDWIS/State, electronic and hard-copy correspondence, and electronic and hard-copy enforcement files) was consistent with the information that was reported to SDWIS/FED as of the January 2017 data freeze. Specifically, the EPA checked whether or not: (a) the violations and enforcement actions found in SDWIS/State matched SDWIS/FED, and (b) the electronic data systems—SDWIS/State and SDWIS/FED—contained all of the information found in the State's hard copy files.

Of the 20 systems reviewed during the enforcement component of the review, 11 PWSs had differences between data in SDWIS/State and SDWIS/FED. These differences are considered Data Flow (DF) discrepancies. There was a total of 70 DF discrepancies of this type found; this information is summarized by PWS in the "Data Completeness Analysis" in the *Enforcement Component Priority Review Analysis Workbook*.

Of the 20 systems reviewed during the enforcement component of the review, 19 PWSs had differences between the electronic data systems (SDWIS/State and/or SDWIS/FED) and the State file records provided for review. These differences are also considered DF discrepancies. There was a total of 289 DF discrepancies of this type found; this information is summarized by PWS in the "Data Completeness Analysis" in the *Enforcement Component Priority Review Analysis Workbook*.

One of the most common differences that the EPA noted during the review was that the enforcement related activities and documents' (NOV/PN Requests, PN receipt, SOX, and Administrative Orders) dates in SDWIS/State and SDWIS/FED were either later or earlier than the actual dates on the letters issued to the PWSs or the date of receipt of PNs received. The EPA found a total of 105 instances of different enforcement document dates between SDWIS and State file records.

Usually the time difference was only a few days; however, five (5) of these instances were a month or more between the dates. This amount of difference could pose challenges with determining PN compliance. Two (2) of the five (5) instances related to NOV/PN request dates; the actual date on the document was almost two (2) months later than what was entered in SDWIS. The other three (3) instances were related to the date of the PN receipt; the actual date was over a month earlier than the date entered in SDWIS.

During the Priority Review, it was discovered that the GWR TT violations were not being entered to SDWIS/State and thereby were not being uploaded to SDWIS/FED. At the time of the Priority Review (April 17, 2017), it was identified that MSDH knew of 77 GWR TT violations. None of the 77 violations were entered in SDWIS/State nor uploaded to SDWIS/FED. The violations, however, are being tracked manually and the State is following up with compliance and enforcement related activities for these violations. However, this is also a DF discrepancy for failure to enter the violations into SDWIS/State and SDWIS/FED. Therefore, there are an additional 77 DF discrepancies not referenced above. See the *Enforcement Component Priority Review Analysis Workbook* for a list of the GWR TT Violations.

Public Notification Observations:

During the Priority Review, several issues were observed with the implementation of the PN rule. For the 20 water systems selected, there were 188 violations that required Tier 2 PNs. The following are the observations that were made upon reviewing the PN information provided: (1) PNs did not always identify the period of violation (this was true both in the request for PN as well as in the PN provided); (2) PNs were not always done timely and violations were not being issued for late PN; (3) PNs were not provided at all in 33 instances, and violations were not issued for failure to provide PN; (4) PNs were not provided, but dates were entered into SDWIS in 14 instances; (5) Dates reported to SDWIS that the PN was completed were not consistent with the date on the PN document; (6) PN requests made by the State were often issued greater than 45 days from the violation compliance period end date.

Of the 188 violations that required Tier 2 PN, 112 violations had timely PN, which was provided by the PWS to consumers within 30 days of being notified by the State of the violation and request for PN. PN for 28 of the 188 violations was not provided timely, and only two (2) of these received violations. Those remaining did not have any violations issued for failure to timely provide PN.

The remaining 47 violations did not have a PN provided in the file records. Of this 47, 33 had no PN receipt information entered in SDWIS or had no violations issued for failure to provide PN. The remaining 14 violations did not include a PN record during the review, however, PN receipt information indicating PN had been provided, was entered into SDWIS. This could not be confirmed, nor could the timeliness of the PN be confirmed, since the file record was not available for review.

It was noted during the Priority Review that the date used for the PN completion (SDWIS Code (SIF)) entered into SDWIS varied. There were three (3) dates that were being used as the date of PN completion (SIF) as found on the PN confirmation provided to the State by the PWS: (1) Date of posting the PN; (2) Date of signature on PN Confirmation by the PWS official; (3) Date of receipt of PN confirmation by MSDH. The difference between these dates varied and at times was as great as several months or more. The lack of consistency made determining compliance with the PN rule difficult. See "Pivot Tier 2 PN Summary" and "Tier 2 PN Summary" of the *Enforcement Component Priority Review Analysis Workbook* for specifics on the information noted above.

The last observation regarding PN pertained to when the State was providing notification of the need to do a PN to the water system. Of the 188 violations requiring Tier 2 PN reviewed, 54 received PN requests within 45 days; 131 received PN requests greater than 45 days; and three (3) never received a PN request. On average, MSDH is providing PN requests within 71 days of the end of the violation's compliance period. This results in a PN not being provided, at times, a quarter or longer after a violation has occurred. See "Pivot Tier 2 PN Request Summary" and "Tier 2 PN Summary" in the *Enforcement Component Priority Review Analysis Workbook* for further details related to when PN is requested.

Recommendations

Develop State EMS and/or SOP). The EMS/SOPs shall address, at a minimum, the following:

- The expectation to address those water systems identified as priority systems on the ETT List within two (2) quarters of appearance on the list, either by returning such water systems to compliance or issuing formal and enforceable mechanisms to return such water systems to compliance as well as to act immediately on acute, health-based violations and subsequently confirm that water systems with such violations RTC. This would help to ensure that the State is consistent with the ERP and the State's PWSS Grant Workplan. This would also ensure consistent implementation of the compliance and enforcement program by all water program staff.
- Description of current enforcement process from start to finish, including defining the available mechanisms used and generally when each would be used or escalated.
- Update the enforcement documents and/or develop models that include the identification of the actual violations triggering the activity and define how the water system is to RTC including required timeframes to complete such activities.
- Establish what date on the PN certification document is used as the PN completion date to ensure that all staff are using the same date consistently.
- Establish procedures on what dates should be reported to SDWIS/State for the enforcement activities to ensure that all staff are using the same date consistently.

Efforts should be made to ensure that data submitted to SDWIS/State is reported timely and accurately and that all violations of 40 C.F.R. §141, such as PN and GWR, are determined and reported.

- Ensure all staff are reporting the dates of the enforcement activities accurately and consistently.
- Decrease the amount of time between the end of the violation period and PN request to ensure that all PNs are provided to the public in a timely manner.
- Make all compliance determinations for failure to timely provide PN and subsequently report violations to SDWIS/FED.
- Report all GWR violations to SDWIS and discontinue the manual only tracking of these violations.

H. Laboratories

The Mississippi Public Health Laboratory (MPHL) was assessed by EPA Region 4 Science and Ecosystems Support Division (SESD) in August 2016. The laboratory's chemistry, microbiology, and radiochemistry areas were assessed during this triennial visit. The resulting deficiencies were minor, therefore the laboratory will maintain their *Certified* status through the three-year period, ending on August 23, 2019. The certification status within each area of concentration is listed in Tables H-1 and H-2. For the primary drinking water contaminants that are no longer being analyzed by the MPHL, the lab uses a contractor with National Environmental Laboratory Accreditation Program (NELAP) accreditation. EPA's policy for using contract labs states; "at the discretion of each state's Certification Authority, allows NELAP accreditation to be accepted in lieu of drinking water certification in terms of producing data for compliance monitoring purposes." See Table H-3 for contract laboratories currently used by MPHL. A few observations made during the program overview and recommendations are listed below.

- The Director of the MPHL Environmental Laboratory retired at the end of April 2017. The current Quality Assurance (QA) Officer will be acting as the Director until the position is filled. The Director's position is critical to the success of the laboratory and should be filled as quickly as possible.
- A new Laboratory Information Management System (LIMS) is to be installed. This database will house all of the laboratory results for the state drinking water program. Currently, the laboratory's in-house developed LIMS contains drinking water compliance sample results only; private or non-compliance sample results are housed in ApolloLIMS. ApolloLIMS allows the lab to report samples in approximately 30 days, unlike the in-house LIMS, which reports at the end of the monitoring period. A LIMS administrator might be helpful to maintain the new LIMS database, and make changes and upgrades as needed.
- The in-house LIMS generates an XML file in the evening and it's used to populate SDWIS/State. If there are errors, program staff correct the issues within a few days of the XML release and upload the corrected data to SDWIS/State.
- Hiring new staff in the laboratory is challenging. When experienced staff leave, it's difficult to find qualified applicants. Therefore, MSDH has downgraded the positions in order to fill them.
- The microbiology lab is currently under staffed. This laboratory also performs milk analysis, certifies other milk state laboratories, and handles approvals for small dairies. Due to the short turn-around time they must meet, adding an additional person in the lab might assist in meeting the needs of the State.
- It would be helpful to include the date the laboratory reported results to the drinking water program staff in the hardcopy files. Although this information is included in SDWIS/State, program staff need the option to print it on the forms for a complete file. This is especially important for LCR reporting requirements.
- Currently the lab is maintaining certification for Uranium by method 200.8.

MPHL Certification Program:

The Laboratory Certification Program ensures that the analytical services for chemical, microbiological, and radiological drinking water samples are performed by competent Mississippi laboratories. There are approximately seven (7) laboratories that have applied for or obtained certification through the MPHL. See Table H-4 for the number of laboratories certified by the MPHL. The Certification Officers (COs) perform an assessment of the laboratory initially, and then subsequently every three (3) years. The COs certify laboratories for a suite of the EPA approved drinking water methodologies and primary contaminants.

SESD assesses the adequacy of the Laboratory Certification Program by evaluating the procedures, responsibilities, organizational structure, staff, certification process, and on-site evaluations. The program was evaluated by SESD in August 2016 and was deemed *Effective* in assuring that all laboratories submitting monitoring data for public water supplies in Mississippi meet the criteria established by the EPA. A few observations and recommendations made during the program overview regarding the Certification Program are listed below.

- The triennial drinking water certification is conducted and coordinated by the MPHL Director. The certifications are conducted at no cost, therefore there is no fee collected from the private laboratories to compensate the State for their time. It might be beneficial to consider charging a nominal fee for the certification services provided by the program to cover expenses for planning, on-site visits and reporting.
- Having a position that coordinates the laboratory certification program would be a valuable addition to the program.

Current MPHLC Chemistry Certification Status Certification Date: August 23, 2016 to August 23, 2019		
Parameter	Drinking Water Method	Certification Status
1,2-Dibromoethane (EDB) and 1,2-Dibromo-3-Chloropropane (DBCP)	EPA Method 504.1	Certified
Volatile Organics	EPA Method 524.2	Certified
Trihalomethanes (THMs)	EPA Method 524.2	Certified
Carbamates - aldicarb sulfone, aldicarb sulfoxide, carbofuran, oxamyl	EPA Method 531.2	*Provisionally Certified
Glyphosate	EPA Method 547	*Provisionally Certified
Haloacetic Acids (HAAs)	EPA Method 552.2	Certified
Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Antimony, Selenium, Thallium, **Uranium	EPA Method 200.8	Certified
Mercury	EPA Method 245.1	Certified
Fluoride	EPA Method 300.0	Certified
Bromate	EPA Method 300.1	Certified
Nitrate as N, Nitrite as N	QuikChem 10-107-04-1-C	Certified
Fluoride	QuikChem 10-109-12-2-A	Certified
Cyanide	QuikChem 10-204-00-1-X	Certified

Table H-1. Current MPHLC Chemistry Certification Status

* Laboratory is developing the method and analyzing required proficiency tests to obtain certification.

** Radiochemistry analyte using Method 200.8

Current MPHHL Microbiology Certification Status Certification Date: August 23, 2016 to August 23, 2019		
Parameter	Drinking Water Method	Certification Status
Total Coliforms	Standard Method (SM) 9223B: Enzyme Substrate Test Colilert, Colilert-18, and Colisure	Certified
Total Coliforms	SM 9221D: PA Broth	Certified
Escherichia coli	SM 9223B: Enzyme Substrate Test Colilert, Colilert-18, and Colisure	Certified
Escherichia coli	SM 9221F: EC-MUG	Certified
Heterotrophic Bacteria	SM 9215E: Enzyme Substrate Method – SimPlate	Certified

Table H-2. Current MPHHL Microbiology Certification Status

Current Contract Laboratories used for Drinking Water Analyses Certification Date: August 23, 2016 to August 23, 2019			
Parameter	Drinking Water Method	Certification Status	Contract Laboratory
Organohalide Pesticide and Polychlorinated biphenyls (PCBs)	EPA Method 505	Certified	Eurofins Eaton
PCBs as Decachlorobiphenyl (DCB)	EPA Method 508A	Certified	Texas Department of State Health Services
OrganoChlorine Pesticides – chlordane, endrine, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, toxaphene	EPA Method 508	Certified	Eurofins Eaton
Herbicides – 2,4-D, 2,4,5-TP (Silvex), dalapon, dinoseb, pentachlorophenol, picloram	EPA Method 515.4	Certified	Eurofins Eaton
Adipate/Phthalates – bis [2-ethylhexyl] adipate, bis [2-ethylhexyl] phthalate	EPA Method 525.2	Certified	Eurofins Eaton
Benzo(a)pyrene	EPA Method 525.2	Certified	Eurofins Eaton
Organophosphorus Pesticides – alachlor, atrazine, simazine	EPA Method 525.2	Certified	Eurofins Eaton
Carbamates – aldicarb sulfone, aldicarb sulfoxide, carbofuran, oxamyl	EPA Method 531.2	Certified	Eurofins Eaton
Glyphosate	EPA Method 547	Certified	Eurofins Eaton
Endothall	EPA Method 548.1	Certified	Eurofins Eaton
Diquat/Paraquat	EPA Method 549.2	Certified	Eurofins Eaton
Benzo(a)pyrene	EPA Method 550.1	Certified	Eurofins Eaton
Gross gamma/alpha	SM 7110 B	Certified	Eurofins Eaton
Rad 226	SM 7500-RA B	Certified	Eurofins Eaton
Rad 228	SM 7500-RA D	Certified	Eurofins Eaton
Chlorinated Acids – Phase II & V 515.3	EPA Method 515.3	Certified	Eurofins Eaton
Dioxin	EPA Method 1613	Certified	Eurofins Eaton
Giardia/Cryptosporidium (Filter)	EPA Method 1623	Certified	Eurofins Eaton

Table H-3. Current Contract Laboratories Used for Drinking Water Analyses

Primacy State	State Laboratory Certification Program Assessments (SLCPA)					Number of Laboratories Certified/Accredited In State (Out of State)				
	Agency	Assessor	Date of last SLCPA	Date of last signed certificate/report	Chemistry	Microbiology	Radiochemistry	Cryptosporidium	Asbestos	
MS	Mississippi Public Health Laboratory (MPHL)	EPA Region 4 SESD	August 23, 2016	February 21, 2017	2(0)	7(0)	0(0)	0(0)	0(0)	

Table H-4. Inventory of Certified Drinking Water Laboratories

IV. REFERENCES CITED

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Mississippi State Department of Health, Office of Health Protection, Bureau of Public Water Supply, 2016, Public Water Systems Capacity Development Program, Annual Implementation Report, State Fiscal Year 2016 (7/1/2015 – 6/30/2016), 71 pages.

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United States Environmental Protection Agency, 2006, Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule, 436 pages.

United States Environmental Protection Agency, Water Protection Division, Drinking Water Section, 2017, Enforcement Component Priority Review Analysis Workbook (an electronic presentation of compliance and enforcement information in Microsoft Excel Workbook format), 27 MB.

United States Environmental Protection Agency, Region 4, Science and Ecosystem Support Division, Quality Assurance Section, 2016, Report of the On-Site Evaluation for Drinking Water Certification, Mississippi State Department of Health, Public Health laboratory, Environmental Services, Drinking Water Laboratory and Laboratory Certification Program, 22 pages.

United States Environmental Protection Agency, Water Enforcement Division, Office of Civil Enforcement, 2009, Memorandum: Proposed Revision to Enforcement Response Policy for the Public Water System Supervision (PWSS) Program under the Safe Drinking Water Act and Implementation of the Enforcement Targeting Tool, 14 pages.

APPENDIX

Mississippi State Department of Health Response to Draft Report

Burns, Robert

From: Moody, William <William.Moody@msdh.ms.gov>
Sent: Monday, November 19, 2018 5:33 PM
To: Campbell-Dunbar, Shawneille; Burns, Robert
Cc: Walters, Karen; Shultis, Charles; Long, Thomas
Subject: Response to the EPA Mississippi Priority Review Report

Categories: State Program Mgt

Shawneille,

This message serves as a response to the content of the report. Ms. Allenbach communicated to us after conferring with you that the State would need to address instances where we believe that the content is in error or doesn't accurately describe the program. Overall, we believe that the content is fairly accurate. However, we disagree or believe that the following items within the report that do not provide an accurate picture of the state's compliance program:

Within Section E. – Revised Total Coliform Rule. Under the Key Observations section, the EPA noted two instances of small non-community water systems where sample siting plans indicated that we were allowing one required routine monthly RTCR sample to be collected at a site that may be more representative of source water quality than of distribution system water quality. I believe that this note is in reference to extremely small systems, in particular, a small community church that happens to have its own water supply based on the official definition of a public water system. Section E. Recommendations ask that the State ensure the site sampling plans reflect that all routine RTCR monitoring occur within the distribution system rather than at source wells. For systems that are extremely small in size and lack basic treatment, as the case with the Church system noted in the report, appropriate sample sites are very limited in availability. A faucet at a well site, while not necessarily reflective of the distribution, is reflective of the water quality provided by the source for these extremely small systems where the actual size of the distribution is very small or possibly only a few feet. Within the report's narrative, it was recommended that samples be collected from the interior of the buildings. It is the state's point of view that this would be a bad recommendation. Bacteriological samples collected at faucets where hot and cold water mix can give false positives which would have a negative impact on compliance for those systems. Furthermore, while not routinely allowed, there may be instances where after careful review of a system's sampling site plan, a source water site will be allowed to be used as a RTCR site. In those instances, the State would be basing its decision on its knowledge of the system and its operational circumstances. In considering extremely small systems with limited or no availability of exterior faucets, source water sampling points should be considered a legitimate site for the collection of RTCR compliance samples.

Within Section H. – Laboratories. One of the items noted that the current Quality Assurance (QA) Officer will be the acting MPHL Environmental Laboratory Director. This is not the case as described in the Section H narrative.

This concluded our response towards the accuracy of the report in reflecting what needs/should be said. Feel free to call me if you need further clarification.

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